

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

p. 27

July 3, 1978

75¢ a copy; \$18/year

IBM, HP Boost Small System Options

• HP Adds at Both Ends

By Jeffry Beeler
CW Staff

PALO ALTO, Calif. — Two systems — one a high-end offering with expanded processing power, the second a low-end introduction with a data base management capability — have joined the Hewlett-Packard Co. family of small business computers.

The high-end system, dubbed the HP 3000 Series III, reportedly provides twice the throughput of the existing Series II and up to eight times the performance of the Series I.

The low-end addition, designated the HP 250, represents the only small business system in its price class with a data base manager, HP officials claimed. It provides three software modules said to simplify data access,

manipulation and presentation.

At the same time, HP also enhanced its 3000 systems line with the introduction of its first three applications packages for manufacturers.

Improved Performance

HP officials partly attributed the Series III's improved performance to the system's main memory, which expands from 256K to 2M bytes — quadruple the capacity of the previous 3000 systems.

They also credited the increased throughput to the system's MPE-III operating software, an enhanced derivative of MPE-I and MPE-II. Upwardly compatible from those previous operating systems, MPE-III provides multipoint terminal support, private-volume disk files and other features usually associated only with mainframe systems, the officials said.

Intended primarily for on-line transaction processing applications, the Series III belongs in the same performance class as the low-end IBM 370 systems and "superminis" like the Digital Equipment Corp. PDP-11/70, Data General Corp. M/600 and Prime Computer, Inc. Model 500, according to (Continued on Page 8)

• Series/1 Gets Cobol

By Jeffry Beeler
CW Staff

ATLANTA — Cobol, additional distributed data processing (DDP) capabilities and a doubled main memory capacity are now available to Series/1 users following an IBM announcement of 12 hardware and software enhancements to that system.

Among the DDP-extending enhancements introduced last week were the Channel Attachment Feature No. 1200, which IBM said links the Series/1 storage units to those of both the Series 30 and all 370 systems larger than the Model 125.

With the addition of Cobol, Series/1 users for the first time can run programs in a language that provides upward compatibility with the 370 line's OS/VS Cobol compiler and Library Release 2, according to IBM officials.

The attachment feature, meanwhile, reportedly represents the first direct channel link between the Series/1 and IBM's largest mainframes and spares users from having to run communications lines between the small and large processors.

Among its other Series/1 enhancements, IBM announced an additional processor with a basic storage capacity

of 64K bytes; the previous minimum Series/1 was 32K bytes.

Other Enhancements

The remaining hardware enhancements to the system include a disk subsystem with five times more storage capacity per spindle than its Series/1 predecessors; a diskette magazine with space for up to 23 recording media; and a two-channel switch for I/O units shared by dual Series/1 processors.

On the software side, the remaining enhancements include a channel attach program that permits data transfer between Series/1 and 370 series applications programs; a Structured Programming Facility (SPF) that aids program development and modification; a sort/merge program that arranges up to eight files in ascending or descending order; enhanced versions 3 and 4 of the Real-Time Programming System plus an enhanced Version 3 of the Program Preparation Subsystem; an enhanced Fortran IV Real-Time Subroutine Library Version 2; and additional support for the Programmable Communications Subsystem.

With the addition of Cobol, IBM has (Continued on Page 6)

Big Apple User Scissors Times For 370 Sorts

By Don Leavitt
CW Staff

NEW YORK — The time needed to sort data for management information system-type summaries has been cut to ribbons by a manufacturing firm here.

Running on an IBM 370/135, internally developed software has cut one job, for example, from 150 minutes with traditional sorts to "less than four minutes," according to the developer. The techniques used are a "major breakthrough" in sorting techniques, he believes, but he wants peer review to confirm or refute his opinion.

George Warner, programmer at Aberdeen Manufacturing Co., readily admitted his Software Optimization for the Retrieval of Data (Sword) can't replace conventional disk sorts for handling high-volume files when the desired end result is a detail printing of all entries in the file. But the core-resident table-driven Sword is "probably unbeatable" at sorting and collapsing detail records into management information system-style summaries, according to Warner, who seems to have performance statistics to prove his point.

Sword's sort-and-combine service module sorts central memory tables — "technically, it's a matrix inversion," Warner commented — on the Model 135 at a typical rate of 1,400 entry/sec. "Note that is a 'per second' rate, not 'per minute,'" he interjected.

A table of 1,000 50-byte entries is sequenced in the using program's table area in .7 second using the 4K Sword module and an 8K-byte (eight bytes (Continued on Page 4)

Analyst Salaries at All-Time High

By Ann Dooley
CW Staff

CLEVELAND — Systems analysts' salaries were at an all-time high last year, amounting to more than twice the average salaries of all nonsupervisory, private-industry workers except farmers, a recent Association for Systems Management (ASM) survey reported.

The median salary for a systems analyst was \$24,786; 26% of those surveyed earned \$30,000 or more. The average starting salary was approximately \$18,000, the survey found.

In compiling the survey data, the ASM defined "systems analyst" more broadly than the computer industry commonly does. In addition to performing the DP function, systems analysts review the information and operational flows within an organization as a basis for service to management, according to the ASM definition.

The 1977 ASM survey, one of a series that has measured the growth trends of the profession over the last two decades, found the systems analyst earning \$30,000 or more generally works in a manufacturing firm located in the northeastern or western part of the country and supervises a large group of workers. He has at least 15 years' experience in addition to an ad-

vanced degree and is more than 50 years old.

Big Earners Double

The number of systems analysts earning \$26,000 or more in 1974 doubled in 1977, although salaries of that amount were virtually nonexistent in 1959, according to past ASM survey results. In 1977, however, nearly 90% of the respondents earned at least

\$18,000, almost 66% earned \$23,000 or more and 26% earned \$30,000 or more annually.

The median salary for systems analysts has risen steadily since 1959, when it reached only \$9,786. In 1965, the median salary was \$11,946; in 1969, it was \$15,435; in 1971, \$16,739; and in 1974, \$18,749.

Survey results indicated a steady (Continued on Page 8)

Job Outlook Bright

WASHINGTON, D.C. — The DP job outlook for new college graduates is excellent, according to a U.S. Department of Labor bulletin that listed large numbers of job openings entered by employers at the 2,500 Job Service offices in the U.S.

Openings for systems analysts totaled 739 from January through March with 550 jobs unfilled at the end of that period. The jobs were in the business, manufacturing and human resources areas and the salaries offered ranged from \$10,000 to \$20,000.

Programmer openings numbered 2,367; 1,880 remained unfilled at the end of March. Those openings

were in the business, manufacturing, education, transportation, government and insurance sectors. Salaries offered were from \$9,051 to \$18,833.

Operator opportunities amounted to 1,083 and 593 remained to be filled by the end of the period. Opportunities were in business, banking, government and education and salaries ranged from \$6,151 to \$11,425.

Key punch operators had 2,427 positions available, with 1,354 still left to be filled by the end of March. Employers in business, government and insurance offered \$5,755 to \$8,984.



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt

Washington Bureau/

Chief Edith Holmes
Staff Writers Catherine Arnst
Jeffrey Beeler
Marcia Blumenthal
Howard Karten
Timothy J. Scannell
Brad Schultz
Marguerite Zientara

Chief Copy Editor

Copy Editors Cheryl M. Gelb
Barbara T. VanScoyoc
Gail Cohen

Photography Editor

Editorial Assistant Ann Dooley
Editorial Cartoonist Denise Petski
Jim Orton

Contributors:

Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES

Vice-President Roy Einreinhofer
Advertising Administrator Terry Williams
Display Advertising Mary Anne Furlong
Classified Advertising John O'Leary
Sales Promotion Director Jack Edmonston
Market Research Kathryn V. Dinneen

CIRCULATION

Vice-President Margaret Phelan
Circulation Manager Barbara Jeannetti
Customer Service Rep Peggy Kelly
Assistant Eleanor Smith

PRODUCTION

Vice-President Lee Vidmer
Supervisor Henry Fling
Assistant Manager Peter Holm
Typesetting Supervisor Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718. England: Roger Frampton, Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Hans-Jürgen Ballnath, Computerworld, c/o CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 34-90-61. Telex: 5215350. Asia: Hidetsuna Sasaki, Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J242461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Near East—\$75 a year; all other foreign—\$125 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher Patrick J. McGovern
President W. Walter Boyd
VP-Marketing Roy Einreinhofer
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan
VP-Production Lee Vidmer



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Not Waiting for Report

OMB Gets Jump on DP Revamp

By Edith Holmes

CW Washington Bureau

GAITHERSBURG, Md. — The Office of Management and Budget (OMB) has taken steps to improve federal management of DP and telecommunications technology without waiting for the final recommendations of the federal DP reorganization project, Walter W. Haase, deputy associate director for information systems policy at the agency, said here recently.

Stating that "it will still be several months before the full impact of the data processing reorganization effort can be assessed," Haase added that most of the moves being made by the Carter Administration are in line with the findings and conclusions of the reorganization project.

The OMB official suggested that the project to reorganize federal DP is but one broad attempt to acquire an independent assessment of the directions in which the organization and management of government computer operations should move.

Actions Already Taken

A number of "very specific" actions have been initiated by the agency in the meantime, however. These measures include the issuance of guidelines to govern the use of personal data files by federal agencies to detect fraud and abuse, the establishment of a mechanism for sharing ideas with state and local governments on new ways to use information technology and the release of a policy requiring OMB taking actions to change federal DP without waiting for reorganization team reports agencies to establish improved computer security programs, Haase stated at a National Bureau of Standards and an Association for Computing Machinery conference.

OMB has already made "several important changes" to the Fiscal Year

1980 instructions to agencies on how to budget for DP and telecommunications. If DP or telecommunications costs for an agency program exceed either \$1 million or 10% of its total projected expenses, justification for the use of these technologies must be included in the overall rationale for the program.

"This will make the user organization, rather than the central service organization, responsible for justifying data processing and telecommunications resources in terms of their contribution to mission performance," Haase explained.

Multiyear Appropriations

The agency has also paved the way for multiyear appropriations from Congress for DP and telecommunications by requiring all arms of the executive branch to describe their needs in these areas four years beyond the budget year. All procurements for DP and telecommunications planned for those years that exceed \$1 million must be identified in a list to be presented to the General Services Administration, the key federal procurement agency, and Congress, Haase said.

"This early planning information should serve to more clearly identify acquisitions included in the President's budget, to allow any questions about these acquisitions to be addressed earlier in the planning cycle and to minimize the current last-minute abortions of procurement actions," the OMB official stated.

In still another move to improve federal DP, OMB has begun drafting a policy that will require agencies to account for the full cost of their DP activities, establish prices to recover these costs from user organizations and allow users the choice of whether to use the services of particular computer installations on the basis of serv-

ice performance and costs, Haase said.

OMB will soon release an annotated index of the more than 200 laws, policies and regulations issued by various parts of the federal government regarding the use of DP and telecommunications, he noted.

Finally, the agency is encouraging federal regional DP councils and other interested groups to form a national federation to foster improved communications technology application and policy development.

Carter Decision Followed

Many of OMB's initiatives have followed President Carter's decision to reorganize the executive office of the president, which includes OMB. Made last year, that decision and the congressional approval that sanctioned it stripped OMB of its operational responsibility to provide computer support to the executive office, directing the agency to focus on government-wide policies for the use of computer technology, information systems and privacy.

OMB later acquired additional responsibility as the President's principal advisor on procurement and management of federal telecommunications systems.

Meanwhile, the federal DP reorganization project continues to work toward the production of its final recommendations, due to be submitted to the President in September. A team of 10 is busy consolidating the reports recently completed by 10 groups studying such issues as standards, personnel and the process by which the federal government acquires computers, Haase reported.

The consolidated, draft recommendations of the reorganization project should be ready for public comment by the end of June, he added.

On the Inside This Week

NEWS

NBS Proposes Three Interface Standards 4
Antitrust Commission Ready to Begin Work 5
Police Chief Probed in Sale of Criminal Data 6
Small Agencies Found Lacking Direction in DP 9
ACM Votes to Retain 'Machinery' 10
Communications Bill Seen Escape From Past 11

EDITORIAL

Editorial: Fundamental Confusion 12
Human Connection: Management and Boredom. . . 13
Taylor Report: Enforced Fraud Reporting 13

SOFTWARE & SERVICES

Test Sites Report Move to Edos/VS Goes Well . . . 15
More Systems Gain SPSS Versions 16
Improving Software Puts New Light on Minis. . . . 18
Packages Keep Work on Time at Navy Center. . . . 19
Rigid Hiring Rules May Lose Promising DPers. . . . 20

COMMUNICATIONS

Least-Cost Routing Saves \$133,000/Year 21
CA Offers Front-End Micros for Syfa Systems. . . . 22
Lear Siegler Adds Micro-Based, Smart CRTs 23
Unit Gives 360, 370 Remote Batch Capability 24

SYSTEMS & PERIPHERALS

Third-Party IBM Gear Now Low Priced. 25
CPUs Give San Diego Shipbuilder Clear Sailing . . . 26
Printer Produces Variety of Graphics Images 27
Multitask Typography System Has 64K Core. 28

MINIWORLD

Virtual System Runs Expanded Programs 29
System Helps County Avert Tax Hikes 29
Comb Matrix Printer Configured Two Ways. 30
Wangco Disk Controllers Emulate DG Subsystems. 31
DS990 Options Grow. 32

MICROCOMPUTING

Self-Taught Teenager Developing Robot. 33
Apple Users Get Link to Stock Portfolio 36

COMPUTER INDUSTRY

Two Pi: Playing David to IBM's Goliath? 37
California Under the Gun for COM Taxation. 37
WUIS Withdraws From Commercial Marketplace. . . 38
Prime's Acceptance on NYSE Affirms Strength. . . . 40
Riads Solidly Implanted in Comecon Nations 41
Dealer Nets Advised for Small Systems Area. 42

SHERLOCK

"Holmes, can't you stop this wave of DOS sorting thefts?"

"No, Watson, I leave that to the chaps at SyncSort."

Call (201) 568-9700.

It's the Scotland Yard of sorting.

Purely as a public service, we at the Yard issue the following all points bulletin for DOS and DOS/VS users:

WARNING

Professor Moriarty, Sherlock Holmes' long-time arch-enemy, is *not* dead as previously reported. He is thought to be alive and well and living in a DOS/VS computer center. He is said to be cleverly disguised as a down-at-the-heels DOS sort program.

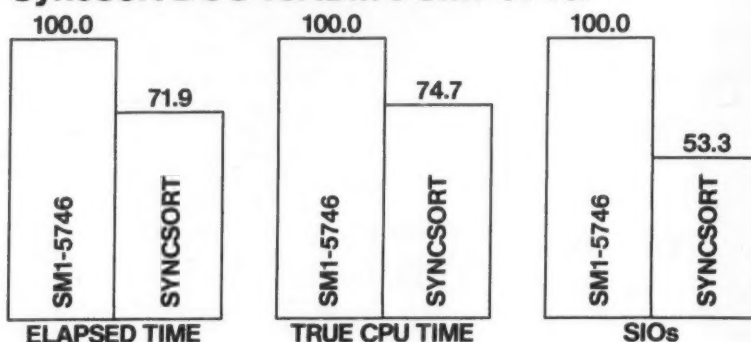
Moriarty's *modus operandi* is simple but effective. Under the guise of performing sorting jobs "well enough," he actually "skims the cream" off the users' True CPU Time, Elapsed Time and SIOs on every sorting run.

By the time the worried manager and staff become aware that their resources are disappearing mysteriously, so is Moriarty. Generally in a hansom cab, under cover of a pea-soup fog.

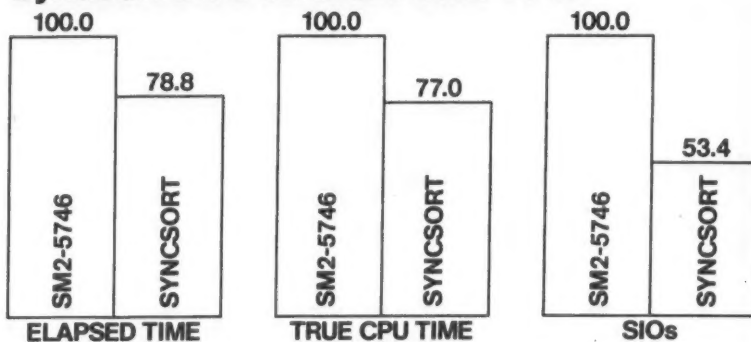
If you suspect someone has been filling his pockets with your resources, call the people at SyncSort. They'll dispatch one of their "Moriarty Detectors"—a systems engineer specially trained to sniff out bad sorts.

A couple of simple benchmarks will show you where your computer resources have been going:

SyncSort DOS vs. IBM's SM1-5746.



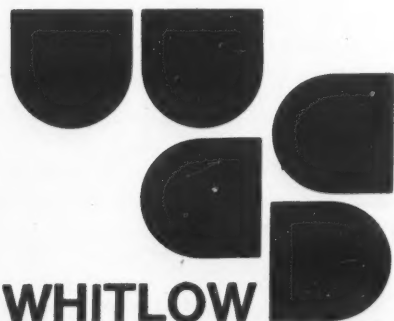
SyncSort DOS vs. IBM's SM2-5746.



The next step is to bring in Inspector SyncSort on a round-the-clock basis. It's the only way, sorting experts say, to make your operation permanently "Moriarty Proof."

OVERSEAS REPRESENTATIVES —

Brussels: CAP/GEMINI Belgium
Dusseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP-GEMINI/PANDATA
Johannesburg: Computing Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTAX
Paris: CAP/SOGETI PRODUCTS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY, Ltd.
Vienna: CAP/GEMINI GmbH



WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Expected to Save \$55 Million NBS Offers Three Federal Interface Standards

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has proposed three computer interface standards it expects will save the federal government more than \$55 million in peripheral equipment for medium- and large-scale systems over the next five years.

Two of the proposed standards — the I/O channel interface and the power

control interface — were revised in response to comments received from the public last year. The third standard — the channel-level operational specifications for magnetic tape — is being offered by NBS for the first time.

If these interface standards are adopted by the government, all federal agencies will be required to use them to assure the best price/performance buys in magnetic tape and disk equipment, according to an NBS spokes-

man. NBS, an agency within the Department of Commerce, is also hard at work on a fourth interface standard that will define the operational specifications for magnetic disk equipment. That standard will become a public proposal within the next year, the spokesman said.

If these proposals become Federal Information Processing Standards (Fips), they cannot be waived by individual agencies. Only the Secretary of Commerce can permit an agency to ignore a Fips — and only when its use will cause a major adverse economic or operational impact on the agency, the spokesman stated.

In an effort to keep future federal interface standards up to the speed of technological innovation, the bureau will invite the computer industry to participate in a joint research associate program, the spokesman said. Under this program, individual companies or trade associations would sponsor technical experts to work at NBS with the bureau's scientists and engineers to develop standards for federal use, he explained.

All three proposed standards incorporate technical specifications prepared by the American National Standards Institute Technical Committee X3T9 and the NBS technical staff.

Anyone interested in obtaining or commenting on one or more of the standards should write to the director, NBS Institute for Computer Sciences and Technology, Washington, D.C. 20234 by Aug. 18.

A public hearing on the standards will be held Aug. 11 at NBS in Gaithersburg, Md. Those interested in testifying at the hearing should contact the institute's director by Aug. 8.

Report Criticizes Use of DP In Design of Hartford Roof

By Howard A. Karten

CW Staff

HARTFORD, Conn. — The collapse of the Hartford Civic Center's roof last Jan. 18 can be attributed partly to incorrect use of the computer that checked some of the engineering calculations, but not to the computer itself, according to the final report submitted to the City of Hartford by the engineering consultant hired to investigate the disaster.

The report, issued by Lev Zetlin Associates, Inc. of New York, cited incorrect computer modeling as a contributory — though not the sole — cause of the collapse. "The initiating cause of the collapse ... was a design deficiency related directly to inadequate bracing" of roof components, the report stated.

An engineering software system called Structural Design Language (Strudl) was used in performing the calculations for the roof, called a space truss, a kind of three-dimensional truss.

Sources familiar with Strudl, which has been in use for several years, said it is basically accurate and stable, although minor errors are detected in it from time to time.

The summary of the final report submitted to the city does not indict Strudl as a cause for the collapse. However, the report stated that "checking and/or reviewing of the space truss contract design documents, computer output

and calculations seems to have been nonexistent."

Incomplete Model

One of the areas of computer misuse discussed in the report is the misrepresentation of the structure to the model. "If the computer model had represented the intermediate diagonals and horizontals and had included the roof loads at the midpoint [and] subpanel points at the top chord, the instabilities and primary bending moments would have been detected by the designer," the report said. There was no indication in the report that the misrepresentation was deliberate.

The calculations for the roof design were apparently not double-checked by anyone, although most other major projects constructed in Hartford are subject to such double-checking. It is a general practice within the engineering profession to accept an architectural or civil engineer's calculations as correct without further verification, but some municipalities do require this auditing.

Sources familiar with the investigation into the roof collapse have said that automated design, which uses computers more heavily in designing and doing the engineering for large structures, might have caught some of the design errors and incorrect assumptions in the Hartford roof blueprints. However, automated design was not in wide use when the civic center roof was designed.

Continuous Monitoring

NBS will continuously monitor the effects these interface standards have on federal agencies and will review the interface's specifications within three years to decide whether technological trends and policy changes dictate that the standards be affirmed, revised or withdrawn.

New York User Finds Way To Slash 370/135 Sort Time

(Continued from Page 1)

per entry) work area provided by the user, he claimed. However, he added, it is extremely difficult to measure the speed of the system accurately.

The system is extremely flexible, he continued, noting that Sword responds to parameter controls loaded whenever the system is to be used. Managers can extract summary information on any basis they want as long as keys are available to identify records appropriately, and they can make multiple passes over a file to get data from more than one perspective, he added.

Two Reasons for Speed

Sword gets its speed two ways, Warner explained. First, it creates 8-byte records identifying the full table entries and uses a paired chain technique to pick up the desired data once the short records are sequenced.

The chaining technique has the net effect of reducing the number of records that have to be moved, since "every other one" goes directly to where it belongs in the final work area, according to Warner.

Secondly, Sword combines data from records with equal keys so the actual sort operation works with a reduced number of pertinent records. In one instance, Warner noted, data on six months of selling at Aberdeen was collapsed from "about half a million" records to 30,000.

Not for Trivial Jobs

Utilizing binary addition, Sword takes less time to consolidate data from equal-keys records that it needs to move the records in the first place, according to Warner. "And even after you'd moved them, you'd still have to add them together for the final summary."

There is some overhead involved in getting Sword ready to do its work, he said, explaining that the system starts

by actually creating code required to meet the parameters of any given run. The value of that approach is that the system, once established, goes right through the entire file "without having to look back at the parameters after handling each record."

The setup time isn't much in absolute terms, but is long enough so Warner feels Sword should only be applied to a "nontrivial" number of records.

Warner seems at least somewhat unsure of how he can acquire the peer review of his work that he seeks. He was considering giving Sword away as a "freebie," but IBM has begun talking to Aberdeen about marketing it as an Installed User Program (IUP), the developer said last week.

At IBM's urging, Aberdeen has applied for copyright protection on Warner's work. Warner was reluctant to say in so many words that he would distribute the code for Sword and instructions on how to use it to anyone interested in seeing it, but he said he'd be glad to hear from anyone who wanted to contact him at Aberdeen's office, 16E. 34th St., New York, N.Y. 10016.

Group Open to Users Of Electronic Mail

CAMBRIDGE, Mass. — The U.S. Electronic Mail Association (Usema), a communications technology user organization, is now accepting applications for membership.

Usema's purpose is to provide a forum for the free exchange of communications-oriented information about electronic mail, according to a spokesman.

A fee of \$30 will be charged for membership. Application forms and a copy of the by-laws are available from Usema, c/o The Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.

Earn a Syracuse University degree through independent study.

Now there's no excuse.

Brief campus residency periods with the senior faculty of a major University allow flexible, self-paced study wherever your job may take you.

BACHELOR OF SCIENCE (Business Administration)
MASTER OF BUSINESS ADMINISTRATION

also:

BACHELOR OF ARTS (Liberal Studies)
MASTER OF FINE ARTS
MASTER OF SOCIAL SCIENCE

For information write or call:

Syracuse University, Independent Study Degree Programs
Room 4N, 610 E. Fayette St., Syracuse, N.Y. 13202
(315) 423-3269 or 3284

Antitrust Commission Ready to Begin Work

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — A Presidential commission mandated to wrestle with the problems posed by large antitrust cases began its six-month life here at the end of June with the appointment of its last member.

The 22 commissioners met in the White House Rose Garden to receive President Carter's blessing. Ordered into being last December, the antitrust commission must complete its work for the President and Congress by Dec. 21 [CW, Dec. 12].

The first battery of hearings, scheduled for July 11-13, will deal with the difficulties associated with "big cases" such as the U.S. government's antitrust suits against IBM and AT&T. During the next few months, the commission will also consider the immunities granted under the Sherman and Clayton antitrust laws, the possibilities for structural relief as a solution to concentrations of economic power and attempts to monopolize various industries under the existing antitrust laws.

Chaired by John Shenefield, assistant attorney general of the Justice Department, the commission has among its members five senators — Orrin G. Hatch (R-Utah), Jacob K. Javits (R-N.Y.), Edward M. Kennedy (D-Mass.), Howard M. Metzenbaum (D-Ohio) and Robert Morgan (D-N.C.) — and five members of the U.S. House of Representatives: Barbara Jordan (D-Texas), Robert McClory (R-Ill.), Peter W. Rodino Jr. (D-N.J.), John F. Seiberling (D-Ohio) and Charles E. Wiggins (R-Calif.).

Other government employees who will be part of the antitrust panel are Michael Pertschuk, chairman of the Federal Trade Commission; Alfred Kahn, chairman of the Civil Aeronautics Board; Judge C. Clyde Atkins of the U.S. District Court for the Southern District of Florida; and Chauncy Browning, attorney general of West Virginia.

Seven members of the private bar and academia complete the antitrust commission. They are Maxwell Blecher of California, Craig Spangenberg of Ohio, John Nicholson of the District of Columbia, Gordon Spivack of New York, Jack Izard of Georgia, Prof. Eleanor Fox from New York University, and Prof. Lawrence Sullivan from the law school at the University of California at Berkeley.

Senate Bill Quiet On Electronic Mail

The U.S. Senate held hearings last week on a bill that would require the U.S. Postal Service to prepare a comprehensive research and development plan by January. Senate Bill 3229 makes no reference to postal initiatives in electronic mail, however.

Sponsored by Sen. John Glenn (D-Ohio) along with Senators Jacob K. Javits (R-N.Y.) and Adlai E. Stevenson (D-Ill.), the bill differs from its counterpart in the House, which requires that by 1982 the Post Office annually spend at least 1% of its total expenditures on R&D.

S. 3229 doesn't demand that the Postal Service allocate a specific amount of money to research involving electronic mail or anything else, an aide to Glenn said. It only requires that

R&D monies come out of the federal subsidy to the Postal Service and that Congress receive an annual report on R&D progress.

The House passed its bill, H.R. 7700, in April after reducing the R&D spending requirement from 2% to 1% and deleting all exhortations to the post office to delve into electronic mail. Concern had been expressed by congressmen, the Justice Department and the private sector that the Postal Service could develop electronic mail with

public funds and then exclude competition by invoking the Private Express statutes, which give the post office exclusive rights to deliver "letters" [CW, Feb. 27].

Waddy Out as Judge Of U.S. vs. AT&T

Judge Joseph C. Waddy found himself relieved of the U.S. government's antitrust case against AT&T recently when a new judge was sworn in at the

U.S. District Court here and a random draw assigned the massive suit to him.

Harold H. Greene, formerly chief judge of the Superior Court of the District of Columbia, garnered the AT&T case along with several others shortly after becoming a federal judge.

As a criminal court jurist for Washington, D.C., Greene had a hand in the trial of the Hanafi Muslims charged with taking of hostages and holding three buildings in the city last year.

Waddy has been the judge in the U.S. vs. AT&T case ever since the government filed its complaint against the telephone company in November 1974. In his latest ruling regarding the case, Waddy granted the Justice Department the right to use documents obtained in private suits brought against Ma Bell.

Washington Update

Announcing

Shadow II

The Quantum Leap In Data Base

In fact, it's not a Data Base Management System at all, rather the world's most advanced TP Monitor. But TP is one of the most critical elements of an effective DBMS System. The trouble is many users select their DC as an afterthought resulting in a significantly compromised DB/DC environment.

For many years now, SHADOW II has been providing data base users with the best in DB/DC. These users evaluated DC as carefully as their DB, in fact with many of the same criteria: performance, data integrity including synchronized recovery, ease-of-use, available facilities, vendor support, security, and more. After a careful

study these users selected the best DB/DC: TOTAL/Shadow, Adabas/Shadow, IDMS/Shadow, DL/1/Shadow, among others.

Our users give up a lot to get the best. More than half the Shadow users gave up another TP System to convert to Shadow. If you want the best rather than an afterthought give us a call.

altergo

40 William Street
Wellesley, Massachusetts 02181
617-237-6132

Shadow II The World's Leading Teleprocessing Monitor
Space/Manager The Ultimate Disk Space Management System

For Job-Screening Purposes Police Chief Probed in Sale of Criminal Data

By Brad Schultz
CW Staff

WHEATON, Ill. — A grand jury here is investigating allegations that a former police chief sold confidential criminal histories obtained from the state's computerized criminal information system to a trucking firm for use in screening job applicants.

Donald L. Saccamonto has been accused of using his authority while serving as police chief for Glendale Heights, Ill., to access the state's Law

Enforcement Agencies Data System (Leads) and sell the criminal histories stored there to Riss International of Kansas City, Mo.

Leads is Illinois' centralized file of criminal information; it includes records of criminal histories as well as wanted and missing persons and stolen articles and securities. It is used to access the National Crime Information Center (NCIC) maintained by the Federal Bureau of Investigation in Washington, D.C.

Although Saccamonto, as police chief, could have obtained NCIC histories, there has been no indication that he sold data from that system.

Newspaper Probe

The accusations against Saccamonto were made in a series of articles in the *Wheaton Daily Journal*, according to Illinois state's attorney, Michael Fitzsimmons. Wheaton is the seat of DuPage County, which includes Glendale Heights. State prosecutors would

make no further statement on the matter since grand jury investigations are secret.

The *Daily Journal* articles charged that William Solak, director of loss prevention and claims for Riss, paid Saccamonto to run record checks on at least 80 persons who had applied for jobs with the firm. Solak paid Saccamonto for the data on four occasions in January and February 1977 with checks ranging in value from \$65 to \$155 but may have paid him at other times as well, the articles stated.

Solak has been "fairly cooperative" in answering questions before the DuPage grand jury, despite the fact he resisted Illinois and Missouri prosecutors' efforts to secure that testimony, according to John Minton, the Jackson County, Mo., prosecutor who engineered Solak's extradition.

Until recently Leads was based on an IBM 370/158 with an IBM 370/155 serving as backup. Each CPU has 2M bytes of storage, according to Dwight E. Bee, who manages the Leads computer facility in Springfield, Ill.

However, one of the first IBM 3032s, a 2M-byte processor, has just been installed to replace the 370/155 in order to handle the increasing volume of Leads traffic, Bee said.

In operation since May 1969, Leads is accessible to 968 Illinois police agencies, 582 of which have on-line terminal interfaces to the 370/155. The rest depend on radio access via intermediary agencies.

Leads currently stores roughly 400,000 criminal case histories, Bee said, adding the system also swaps information with the NCIC data base in accordance with NCIC guidelines.

In addition, Leads stores about 250,000 "hot files" under seven different categories, such as missing persons and stolen cars, guns and securities.

'Dumps' Under Study

Glendale Heights — a relatively young community located just west of Cook County, in which Chicago is located — depends on DuPage's county-wide police dispatching radio service to access Leads and NCIC. This service, called Du-Comm, was allegedly used by Saccamonto to obtain the histories he is accused of selling.

Local police chiefs are investigating whether Saccamonto used Du-Comm to tap other crime data networks besides Leads, such as NCIC, in connection with this matter, according to an informed source. The chiefs are doing this by studying "dumps" of old Du-Comm transmissions, the source said.

Under U.S. Public Law 92-544, a law enforcement agency may only provide NCIC criminal histories to other government bodies under specific authorization by a state statute that has been approved by the U.S. Attorney General [CW, May 29].

A police agency found to have abused either NCIC or Leads data is disenfranchised from that service as long as the offender remains with the agency, according to Buell and Bee.

Saccamonto is currently fighting to remain with the department in a "reduced" capacity, a source said.

Bee noted that the alleged Du-Comm abuse is of "an extent and a magnitude" unprecedented in Illinois.

IBM Gives Series/1 Cobol, Extends DDP

(Continued from Page 1)

increased to four the number of programming languages available with the Series/1. Previous languages supported by the system include PL/I, Fortran IV and Assembler.

Series/1 Cobol comes as two licensed programs: a Compiler and Resident Library and a Transient Library. Assorted development aids available with the language allow users to write Series/1 programs on larger systems as long as those programs use the same hardware as the Series/1, IBM spokesmen explained.

Some of those program development aids include symbolic debug, which maps data areas in Cobol format; flow trace, which identifies the last statement before an abnormal termination; and error checking and error messages.

The channel attachment reportedly allows the Series/1 to act as a front-end processor for a 370 system. It also serves as a controller with 32 device addresses for a 370 and one device address for a Series/1.

Fifth Processor

The small system's latest processor, the 4955 Model E, represents the fifth member of IBM's Series/1 CPU family and is said to expand in 64K-byte increments from 64K bytes to 256K

bytes. A 64K-byte storage card uses 2K chips with 72 memory module/card, compared with 36 module/card for the earlier Series/1 processors, which use 32K-byte cards, IBM officials said.

This increased storage density has cut the cost of a 64K-byte increment to \$3,800, they noted.

The Model E reportedly executes instructions in an average of 265 microsec, provides a memory that cycles in 880 nsec and offers many of the same features as previous 4955 family processors including a microcoded instruction set, four priority interrupt levels and vector interrupt.

The Series/1's latest disk subsystem, the Model 4963, stores 58M to 258M bytes with one primary drive and up to three expansion drives, IBM sources said. Both the primary and expansion drives come in two versions: a 58M-byte unit with an extra 128K bytes of fixed-head storage and a 64M-byte unit.

For most practical applications, users can attach four to six of the subsystems to one Model E processor, one spokesman said.

Equipped with overlapped seek capability, the 4963 holds almost 65M byte/spindle, whereas earlier Series/1 subsystems held only 13.9M byte/-

spindle, he added. Whether the primary drives operate alone or with expansion units, the subsystem accesses in an average of 25 msec and transfers 1.03M byte/sec with 9.6 msec latency.

3270 Protocol

SPF, meanwhile, operates with the 370 Time Sharing Option (TSO) and is said to permit a Series/1 to communicate bisynchronously with a host 370 through the 3271 protocol. Some of the features available with SPF include CRT screen editing and scrolling plus data insertion and deletion.

The diskette magazine incorporates a carriage assembly with five slots, two for magazines that store up to 10 diskettes each and three that hold individual diskettes.

Capable of accessing any diskette in 5 sec or less, the Model 4966 unit stores as many as 27M bytes and transfers a maximum of 125K byte/sec, the spokesman said.

Times and Prices

The Series/1's Cobol compiler and Resident Library costs \$3,700 or \$62/mo, while the Cobol Transient Library costs \$300 or \$5/mo. Both programs will be available next May.

The Channel Attachment Feature No. 1200 for 370s also becomes available then; it sells for \$2,175, whereas its Series 30 counterpart will cost \$2,625 when shipments start in October 1979.

A basic version of the Model E processor, available this September, sells for \$11,000, compared with \$4,705 for the diskette magazine with a February availability.

Deliveries of all four disk subsystem models will also begin next February. The 58M-byte primary drive, 58M-byte expansion drive, 64M-byte primary drive and 64M-byte expansion drive cost \$11,420, \$9,720, \$10,700 and \$9,000, respectively.

SPF, which will be available this October, costs \$210/mo — a charge IBM plans to waive after 24 months.

Shipments of both the two-channel switch and the Fortran IV Real-Time Subroutine Library Version 2, which cost \$2,550 and \$336 respectively, will start in September.

Both the channel attach program, which costs \$1,250 or \$21/mo, and the sort/merge program, which costs \$400 or \$7/mo, will be available next May.

Additional support for the Programmable Communications Subsystem will cost \$1,150 or \$20/mo next June.

All Series/1 hardware and software enhancements are available from IBM's General Systems Division at Box C-1645, Atlanta, Ga. 30301.

MICROLINE

- DATA COMMUNICATIONS
- PROCESS CONTROL
- MONITOR, CONTROL & DIAGNOSTICS...

are only a few of the areas in which the Utec Microline Processor has been utilized. The applications for this device are virtually unlimited and, at times, rather unique.

Whether your application is standard or custom, Utec can help.

• DATA COMMUNICATIONS

- Computer front end for TWX, Telex and private wire
- Line speed/code/protocol conversion
- Remote data entry systems
- Remote and local data acquisition
- Automatic dialing and answering
- Message switching
- Call diversion equipment
- Store and forward information systems

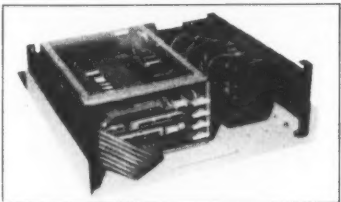
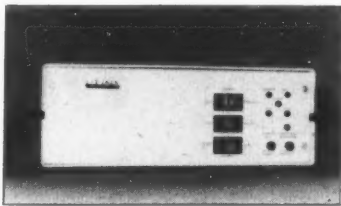
• PROCESS CONTROLLERS

- Telemetry control systems
- Fuel dispensing systems
- Radio station remote control
- VHF and microwave link remote control
- Audio matrix switching system

• MONITOR, CONTROL AND DIAGNOSTICS

- Traffic light control systems
- Pollution monitoring systems
- Inventory monitoring systems
- Climate control systems
- Security systems
- Smoke detection systems
- Network management systems

PROCESSOR & CONTROL SYSTEM



The Microline is offered as a complete system including programming or as an OEM product. For more information or to discuss your requirements call 201-779-0430, or write, Utec Corporation, 871 Allwood Road, Clifton, New Jersey 07012.

UTEC

BURROUGHS USERS—A LINE PRINTER FOR YOU.

**At 30 to 50% off
Burrough's price for
the same printer.**

If you have a 300-1800 LPM printer requirement, contact BDS. Don't buy your printer from Burroughs. Do buy the same Dataproducts printer that Burroughs offers, but buy it from BDS and save 30 to 50%.

BDS printers are in complete conformity to Burroughs specifications. We supply the interface required to make the printer 100% compatible with your CPU buffered controller. If you don't have a buffered controller, BDS will supply either the PCC version, or the new DLP (Data Link Processor) version for your X800 System.

BDS delivers fast for we are stocking distributors. And we offer national service.

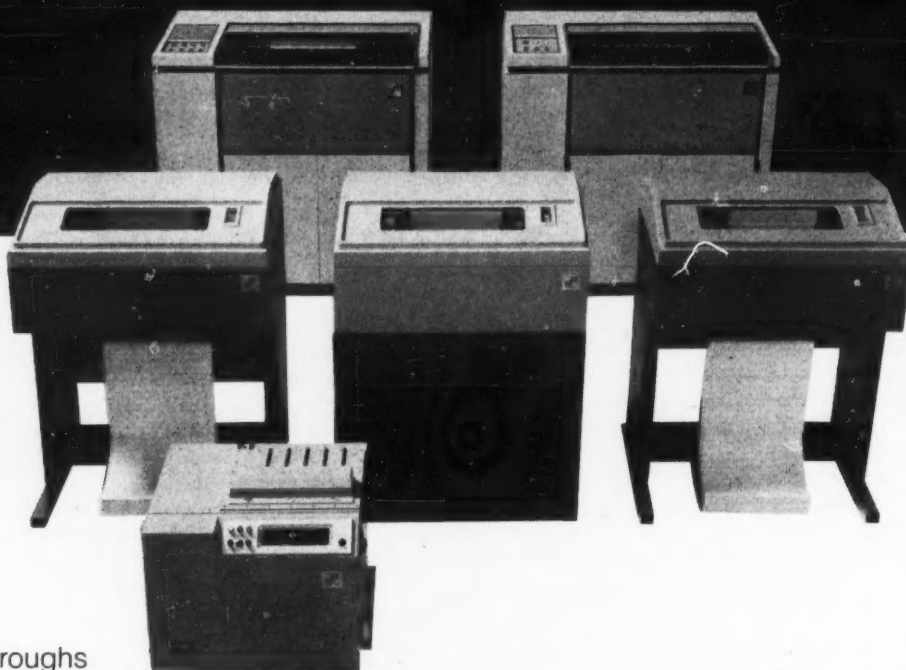
Featured in the Dataproducts list of line printers:

- ☐ The 2200 Series-gives significantly low operation cost at 300, 600, and 900 LPM.
- ☐ The 2550 Charaband-sets a new standard in horizontal font printers at 1200-1500 LPM. An added bonus—two character sets standard.
- ☐ The 2470 Heavy Duty Drum-offers real price performance advantage at 1500-1800 LPM.

The business of BDS is selling Dataproducts printers to the end-user and System House marketplace. We have sold hundreds of these printers to Burroughs, DEC, HP, and practically all mini-users. So, if you are interested in saving 30 to 50% of printer costs, call us or mail the coupon.

PRICE PERFORMANCE			
Speed (LPM)	Dataproducts Model No.	BDS Prices	
		Printer	Controller and Cable*
300	2230	\$14,000	\$2,500
600	2260	18,000	2,500
900	2290	25,000	3,000
1200-1500	2550	32,000	3,500
1500-1800	2470	32,000	3,500

*Required only if your present CPU needs printer buffered controller.



**Yes, I want to save
30 to 50% of printer costs.**

The computer system I use _____

My line printer requirements are _____

Name _____

Title _____

Company _____

Street _____

City _____ Zip _____

State _____

Telephone _____

BDS Computer Corporation, 1149 Chestnut St.
Menlo Park, CA 94025, (415) 326-2115

BDS

**BDS Computer Corporation, 1149 Chestnut Street
Menlo Park, CA 94025, (415) 326-2115**

HP Adds High-, Low-End Small Business Units

(Continued from Page 1)

to one spokesman.

The HP 250, by contrast, is said to suit "experienced" end users and OEMs and to compare roughly in performance to the IBM 5100 and System/32, DG CS series, Burroughs Corp. B80 and Univac BC/7.

System Expandability

Main storage for the Series III consists of 16K random-access memories that cost \$8,000 for a 256K-byte module. Series I and II users can reportedly field-upgrade their configurations to the top-of-the-line system merely by inserting additional processor boards into their CPU chassis.

Depending on system size, a typical upgrade involves the addition of six to eight boards and takes an average of one day, according to the spokesman.

The HP250, meanwhile, provides no such clearcut path for system expansion. Users, however, can upgrade the system, which typically incorporates two 1.2M-byte disk units, by adding a third unit.

The system also accommodates a 20M-byte HP 7906 cartridge disk unit with 10M bytes of fixed storage and an equal amount of removable storage.

In announcing the Series III, HP also enhanced its DS/3000 distributed systems networking facilities with optional automatic data compression that the spokesman said typically allows 3000 systems to speed Ascii data transmission by 40% and at times to achieve savings of up to 80%.

In addition, the firm said it has modified its Image/Query software, a data base management package, to allow a local system to access a remote Image data base without forcing users to change their applications programs.

MPE-III Features

Features available with the Series III's enhanced operating system include tape labeling, a unified command language, the capability of accommodating up to 32 local CRT terminals with one input port and the ability to provide each removable disk pack with its own index.

With HP's recently introduced asynchronous repeaters, the multipoint terminal support capability allows local terminals as far as 4,000 feet from each other to communicate synchronously or asynchronously at speeds up to 9,600 bit/sec, the spokesman said. The multipoint option is also said to support 32 remote terminals operating synchronously at speeds up to 9,600 bits/sec.

Under MPE-III, Series III users can also treat any disk pack except the system disk as a private file for designated uses only, the spokesman explained.

The operating system's tape labeling capability, meanwhile, reportedly simplifies the exchange of data between HP and non-HP systems by allowing the Series III and other 3000 series members to run tapes that have been labeled to Ansi or IBM format Ebcidic standards.

A fourth MPE-III feature — the unified command language — provides simplified instructions that help terminal users circumvent data errors, HP said.

As standard components of the HP

250 data base manager, HP has included Query/250, Forms/250 and Report Writer/250 software modules.

Query/250 permits users of the data base manager to retrieve, update and modify data without having to write additional programs. Forms/250 helps users create and modify CRT-displayed forms for data input and output, while Report Writer/250 aids report production with standard features like automatic paging controls and built-in restart.

The HP 250's data base manager, which represents a subset of the Image software package used with the 3000 systems, also comes with HP's Business Basic.

Basic Configurations

A basic 256K or 2M-byte Series III with MPE-III incorporates a 50M-byte Model 7920 disk system, 1,600 bit/sec tape system, 15 asynchronous terminal ports and a Model 2640B CRT console. The system also comes with an optional 120M-byte Model 7925 disk system and can accommodate up to eight mass storage units for a maxi-

mum capacity of 960M bytes.

A standard HP 250 holds a 32K-byte user memory expandable to 64K bytes and a 128K-byte system memory expandable to 192K bytes. The low-end system also incorporates a 1,920-character adjustable CRT terminal with a recessed keyboard and a standard 180 char./sec Model 2631 matrix printer or an optional 30 char./sec Model 9871 character printer.

The basic HP 250 costs \$24,500, compared with \$115,000 for a basic Series III system. A typical 1M-byte Series III configuration with a 120M-byte disk unit, Cobol and Image/Query software costs \$152,000, while a typical 2M-byte system with a 240M-byte disk unit, 1,600 bit/in. tape unit, 15 asynchronous terminal ports, two multipoint lines and associated software support sells for \$213,000.

Deliveries of the HP 250 will begin in September, while shipments of the 3000 Series III are starting immediately from HP at 1501 Page Mill Road, Palo Alto, Calif. 94304.

System Analyst Salaries at All-Time High

(Continued from Page 1)

growth in the number of systems analysts employed in all industries, with a slight decline in manufacturing and a slight rise in public utilities since 1974, when the last survey was conducted.

DP service firms showed the largest percentage of increase in 1977 salaries. Together with manufacturing companies, these areas paid higher salaries than did insurance or educational institutions.

System analysts employed by the government last year earned a mid-range salary of \$20,000 to \$30,000; few survey respondents earned either more or less than that amount.

Systems analysts are usually found in urban areas, the survey showed, but geographical areas of employment seem to have stabilized, reducing migration. The Midwest employed the largest percentage of analysts in 1977,

although that number decreased slightly since 1974.

The Northeast was the second largest employer of systems personnel; the Southwest employed the smallest number. Salaries were relatively equal across the board and usually reflected cost-of-living rates in a specific area. Canada had the highest percentage of systems analysts earning \$23,000 or more and the U.S. Southeast had the lowest.

Years of Experience

The largest percentage of systems analysts — 33% — have worked 10 to 14 years in the profession. In 1977, 19% of the respondents had worked more than 20 years as systems analysts. The percentage of those with less than 10 years' experience continued its 20-year decline.

A growing number of systems analysts have switched jobs rather than stay at one company. The survey showed 1,068 respondents — 31% — had worked for only one company, while 690, or 21%, had worked at three or more jobs. This indicated a steady increase from 1959, when only 13% had changed jobs more than three times.

The survey also indicated that experience has a direct and important bearing on salary. Respondents with three or less years of experience earned \$18,000, while those averaging 20 or more years earned \$29,000.

Experience was obtained from a variety of functional areas, with the most common being finance and/or accounting, according to the ASM. Other areas of experience were found to be in general administration, purchasing, sales, personnel, engineering and economics.

Education and Age

Systems professionals showed an interest in educational advancement. Two-thirds of those surveyed had at least an undergraduate degree and 23% had masters or Ph.D. degrees. Nearly 40% of the college graduates had ma-

jored in business administration, while the number of those majoring in science or engineering increased. Those with no formal college education showed a slight decrease in number.

In the noncollege-educated group, 50% earned at least \$23,000; 66% of the college-educated respondents earned this amount or more and half of the college educated earned more than \$26,000.

Systems analysts under 30 years of age were relatively few while 43% were in the 30 to 39-year-old age group — a percentage that has remained fairly constant since 1959. The percentage dropped in the 40 to 49-year-old group and sunk to 16% in the 50 to 59-year-old group, suggesting many gravitate to other areas of the organization.

Those systems analysts 50 to 59 years old represented the highest income brackets in 1977, with 23% earning \$35,000 or more.

Most systems departments are comprised of fewer than 10 employees, a figure that has not changed over the years, the ASM indicated. But 91% of those system analysts supervising more than 50 employees reported salaries in excess of \$26,000 and 79% said they earned more than \$30,000.

The survey showed more respondents working in manufacturing than in any other field, but it also showed an increased number of analysts in companies involving communications, construction, engineering, publishing, aerospace and medicine and in public utilities.

Manufacturing, service and educational institutions reported the smallest systems groups, while public utilities and transportation companies had the highest percentage of large system groups. The systems practitioner performed an average of six different functions in the systems unit, a figure which did not vary according to the kind of company, the survey showed.

The ASM survey, in the form of a two-part questionnaire, was sent to approximately 8,500 ASM members; 3,355 replied.

benefit management?

Will your benefit software produce, on demand, 5500 data, an SSA, an ERISA Benefit Statement and a total management analysis of the real cost of all fringe benefits, per employee?

If it won't, ask Joe Nestor (617) 851-4111, Wang Laboratories, Lowell, MA 01851, about the new Wang Benefits Management Software System for 360/370, Honeywell and Univac.

Fringe benefits cost too much these days to neglect.

WANG

Federal Study Notes Duplication

Small Agencies Found Lacking Direction in DP

By Ann Dooley
CW Staff

WASHINGTON, D.C. — A federal study group set up to examine how small federal agencies handle information technology has found that they use outdated equipment, tend to duplicate work and lack direction.

Part of President Carter's DP reorganization project, the team based its report on a study of the 27 agencies whose annual DP budgets are each less than \$10 million.

The agencies studied were the Nuclear Regulatory Commission, the Consumer Product Safety Commission, the Small Business Administration, the Federal Trade Commission, the Interstate Commerce Commission, the Securities and Exchange Commission, the National Labor Relations Board, the Civil Aeronautics Board, the Federal Home Loan Bank Board and the International Communications Agency.

The review team found that, in most cases, top management has not given DP the full support and direction needed. Top management was found to have little interest or expertise in the field.

But the main reason for the lack of continuity and efficiency, according to the team, is frequent politically induced changes in agency top management. Such turnover often leaves the DP function floundering, and plans for improving performance may be dropped when a manager leaves.

Decision-making falls to middle-level managers with technical expertise but little experience in general management, the group found. Although competent, these managers frequently don't have a clear idea of the agencies' long-range goals.

These faults result in inefficiency and a failure to exploit information technology to its potential, the group concluded.

Less than half of the agencies reviewed had any kind of formal written long-range plan for information processing. This resulted in poor strategy and worse budgeting practices, which at times kept the DP function from keeping up with the growing needs of the agency.

Resources Lagging

The group also found that computer equipment and resources are lagging behind those in the private sector. Most agencies use "old, tired" equipment and accompanying procedures based on older technology so that the potential impact of information technology is not being realized. Much of the hardware in use is quickly becoming obsolete, with some no longer in production and even spare parts unavailable.

Many of the agencies are just beginning to take advantage of minicomputer technology and still only to a limited extent, the group observed. Some agencies use time-sharing services which tend to eliminate or reduce the problems of obsolescence, but that method also has drawbacks.

Another reason for poor performance, according to the research group, is that a great amount of work is duplicated among agencies.

Duplication most frequently occurs

when very closely related systems are installed, the group found. Often an agency will work on developing a software application another agency already has in operation.

Very few joint projects have been attempted and many agencies are reluctant to use — or have not even heard of — the General Services Administration's Software Exchange Program. At times, several different agencies have unknowingly bought the same software package from a private contractor, the team reported.

Since the agencies work independently, with no single force for coordinating their use of information technology, they try the same applications

and continually make the same mistakes, the group found.

In addition to the other failings, information technology was not being used to its full potential in any of the agencies studied, partly because no single central unit in government exists to direct, collect and retain that kind of information, the review team noted. As a result, most small agencies are forced to "go it alone" rather than look to one source for help and direction.

The research team suggested that efforts to correct the problems would involve issuing general policy and management guidelines and strengthening the budget process. The group also

suggested establishing a computer utility as the primary source of supply for all small users' computing capacity and establishing a central unit for information technology that would provide a central, consistent source of support and direction for information technology.

In addition, the group recommended that each agency's information processing unit submit short- and long-range resource plans that are integrated with overall goals. The unit would report to a major decision-making body in the agency.

The team, which began its work last year, consists of representatives from the private as well as the public sector.

Get the most out of your 360/370 with CA Software.

Let's face it, at today's costs getting the most for your computer dollars is increasingly important. That's why you should seriously consider leasing our tried and true software.

Good Reasons to Inquire

We offer a wide range of products at competitive costs. From the very start of your free 15-day trial, you'll find that CA Software is easy to install and easy to use.

Dependable Support

Once installed, you'll rarely need assistance with our smooth running programs. However, should any questions arise our technical experts will offer speedy support.

CA customer's also receive continuing enhancements.

The CA Software Family

The products listed below are available as follows:

★ for DOS, DOS/VS or equivalent
✓ for OS, OS/VS or equivalent

We've invested millions to make our products the best that money can buy. Here's a brief list of what we offer:

Sort Utility Program ★ ✓

Over 2800 users world-wide enjoy valuable savings with the Datapro Honored CA-SORT.

Disk Management ★

Our system for optimum disk space utilization with catalog support is called: CA-DYNAM/D

Report Generator ★ ✓

For fast information retrieval and greatly reduced programmer workload ask for CA-EARL.

Tape Management ★

For control, security and improved use of your tape library and resources get CA-DYNAM/T.

On-Line Programs ★

CA-MAINT and CA-MONITOR provide for efficient batch and on-line program development and maintenance.

VM/370 Software

Numerous programs are also available for the VM/370 user.

We offer free information on all of our products. Reply today!

MAIL THE COUPON
OR CALL TOLL-FREE

800-221-4767

NY State Call: 212-355-3333

Member: Software Industry Association

COMPUTER ASSOCIATES

655 MADISON AVENUE
NEW YORK, NY 10021

U.S. OFFICES:

New York, California, Connecticut, Georgia, Illinois, Michigan, Missouri, Ohio, Texas, Virginia

WORLD-WIDE DISTRIBUTION:

Argentina, Australia, Austria, Belgium, Brazil, Caribbean, Chile, Colombia, France, Germany, Guatemala, Holland, Israel, Italy, Japan, Mexico, Netherlands, Scandinavia, South Africa, Southeast Asia, Spain, Switzerland, United Kingdom, Venezuela

☐ YES! Please send information on: _____ cw7/3

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone No. (_____) _____ CPU _____ OP/SYS _____

ACM Votes to Retain 'Machinery'

NEW YORK — A move to drop the "Machinery" from the name of the Association for Computing Machinery (ACM) was defeated by a membership mail vote of 5,170-4,085 with 487 abstentions.

The ACM announced the defeat of the constitutional amendment proposed to change the organization's name at the same time it announced the elections of Daniel D. McCracken, Peter J.

Denning and David H. Brandin to two-year posts as ACM president, vice-president and secretary, respectively.

Had two-thirds of the total ACM membership — 6,170 members — voted for the measure, the organization would have become simply the "Association for Computing," while retaining the acronym "ACM."

Supporters of the proposal had argued the term "Machinery" was more suitable when

the organization was founded in 1947, when the focus of concern among computing professionals was hardware.

The advent of sophisticated software and its greatly expanded role in system development, however, as well as the growing sensitivity to the "human dimension" in computing, made the association's title too restrictive, the proponents contended.

A grammatical problem was also evident in the usage of the phrase "for Computing Machinery," some said; taken literally, it means ACM is a group of devices.

McCracken, best known as the author of programming language texts, defeated ACM Treasurer Aaron Finerman for the presidency. He replaces Dr. Herbert R.J. Grosch in that capacity. Finerman is continuing as treasurer.

Elected to four-year terms as members-at-large of the ACM Executive Council were Ro-

bert L. Ashenhurst, Portia Isaacson and Jeffrey D. Ullman. New regional representatives on the council are Monroe M. Newborn, Northeast; Joseph A. Leubitz, North Central; Fred N. Brand, Pacific; and Robert R. Korfhage, South Central.

Vendor Schedules N.Y. Seminar

NEW YORK — General Datacomm Industries, Inc. will sponsor a workshop on Wednesday afternoon, July 12, at the City Midway Club at 140 Broadway here.

The workshop will be conducted by Charles P. Johnson, General Datacomm president, who will discuss digital data systems as they impact the data transmission equipment industry.

Further information on the workshop is available from Robert K. Otterbourg & Co., 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

SCS Sets Tutorial

NEWPORT BEACH, Calif.

— The Society for Computer Simulation (SCS) will hold a one-day tutorial seminar on Thursday, July 27 entitled "What Simulation Specialists Should Know About Microprocessors."

The seminar was designed to dovetail with the end of the three-day 1978 Summer Computer Simulation Conference, which will also be held here at the Newporter Inn.

The seminar will discuss the uses and applications of microcomputers in varied fields of computer simulation.

The all-day program will be open to SCS members and nonmembers on a first-come basis. Registration is \$30 for members and \$50 for nonmembers, which includes all course materials, coffee and lunch.

Additional information is available from SCS at P.O. Box 2228PR, La Jolla, Calif. 92038.

Security Workshop Planned

LEXINGTON, Ky. — The University of Kentucky will sponsor the 21st International Operational Data Security Workshop at the Carnahan Conference Center, Newtown Pike, here July 10-13.

Eighteen speakers at 27 sessions will present their views and exchange experiences with attendees during the four days.

DP auditing, operating sys-

tem security, application programs for manipulation and the use of data encryption will be discussed.

The fee for the workshop is \$525, which includes four lunches, a dinner and workbook. Additional details are available from Robert J. Wilk, president, Operational Data Security Corp., 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

168
Wanted to buy!

Call Michael O'Connell at
COMDISCO (312) 698-3000
or your nearest COMDISCO office.

COMDISCO

TI-810's
TI-765's
IN STOCK

Call toll free

800-241-9960



EQUIPMENT RESOURCES, INC.
1175-4 Fleming Street, Smyrna, GA 30080
1-800-241-9960, In Georgia call (404) 434-1382
COMPUTER SYSTEMS AND EQUIPMENT

Calendar

Aug. 1-2, Troy, N.Y. — **Mini-computer Data Base Management Systems: The Latest Developments**, sponsored by Rensselaer Polytechnic Institute (RPI) School of Management. Contact: School of Management, RPI, Troy, N.Y. 12181.

Aug. 2-4, Washington, D.C. — **Word Processing, Planning, Managing and Controlling for Greater Productivity**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Meyer Drive, Arlington, Va. 22209.

Aug. 2-4, Los Angeles — **Data Communications Services and Protocols**, sponsored by Technology Transfer, Inc. Contact: Technology Transfer, P.O. Box 49765, Los Angeles, Calif. 90049.

Aug. 6-9, Jerusalem — **Computers, Communications and Technology Transfer**, sponsored by the Information Processing Association (IPA) of Israel. Contact: JCIT 3 Secretariat, IPA, P.O. Box 13009, Jerusalem, Israel.

Aug. 6-10, Washington, D.C. — **16th Annual Conference of the Urban and Regional Information Systems Association (Urisa)**. Contact: Urisa, Suite 800, 180 N. Michigan Ave., Chicago, Ill. 60601.

Aug. 7-9, Toronto — **Using and Understanding Computer Graphics**, sponsored by Frost & Sullivan, Inc. Contact: Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Aug. 7-10, Chicago — **Forms Design Course**, sponsored by American Management Associations (AMA). Contact:

AMA, 135 W. 50th St., New York, N.Y. 10020.

Aug. 7-11, Boston — **Manual Systems: Fundamentals of Analysis and Design**, sponsored by American Management Associations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020. Also being held Aug. 21-25 in Chicago.

Aug. 8, Indianapolis — **Managing People**, sponsored by Fred Pryor Seminars. Contact: Fred Pryor Seminars, 5909 Martway, Mission, Kan. 66202. Also being held Aug. 15 in Cincinnati, Aug. 18 in Kansas City, Aug. 21 in Seattle, Aug. 22 in Portland, Ore., Aug. 25 in Salt Lake City and Aug. 28 in Detroit.

Aug. 14-16, Boston — **Performance Evaluation**, sponsored by Technology Transfer, Inc. Contact: Technology Transfer, P.O. Box 49765, Los Angeles, Calif. 90049.

Aug. 15-16, New York — **The Bell Data Network and Advanced Communications System**, sponsored by The Yankee Group. Contact: The Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.

Aug. 16, New York — **Seminar on Interactive Computer Graphics**, sponsored by Applied Urbanetics, Inc. Contact: Joe Nadar, Applied Urbanetics, 1701 K St. N.W., Washington, D.C. 20006.

Aug. 21-23, Chicago — **Computer Networks**, sponsored by Technology Transfer, Inc. Contact: Technology Transfer, P.O. Box 49765, Los Angeles, Calif. 90049.

Aug. 21-23, San Francisco —

Office Automation Systems, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Meyer Drive, Arlington, Va. 22209.

Aug. 21-25, Leiden, The Netherlands — **Compstat '78: Third Symposium on Computational Statistics**, sponsored by the University of Leiden. Contact: Compstat '78, c/o Centraal Reken Instituut; University of Leiden; Wassenaarseweg 80; Leiden, The Netherlands.

Aug. 21-25, Atlanta — **Fifth Annual Conference on Computer Graphics and Interactive Techniques**, sponsored by the Association for Computing Machinery (ACM). Contact: ACM, 1133 Ave. of the Americas, New York, N.Y. 10036.

Aug. 21-23, Washington, D.C. — **Digital Encoding and Processing of Voice and Video**, sponsored by George Washington University. Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Aug. 23-25, Washington, D.C. — **Microfilm Information Systems**, sponsored by George Washington University. Contact: Martha Augustin, George Washington University, Washington, D.C. 20052.

Aug. 28-Sept. 1, Canberra, Australia — **Eighth Australian Computer Conference**, sponsored by the Australian Computer Society (ACS). Contact: ACS '78 Program Committee, P.O. Box 448, Canberra, A.C.T. 2601, Australia.

Communications Bill Seen Escape From Past

By Marguerite Zientara
CW Staff

BOSTON — The rewrite of the Communications Act of 1934 proposed by the House Subcommittee on Communications is "an attempt to get away from all the tired ways of the past," Subcommittee Chairman Lionel Van Deerlin told the annual meeting of the Utilities Telecommunications Council (UTC) here recently.

The UTC represents the telecommunications interests of more than 2,000 electric, gas, water and steam utilities before the Federal Communications Commission (FCC) and other federal and state agencies.

The net effect of the proposed rewrite, according to Van Deerlin, would be to "assure consumers the benefits of the marketplace." With competition in the field, consumers will get innovation, the lowest possible prices and "no layered processes of government" keeping prices artificially high, the California Democrat said.

Parts of the Communications Act of 1934 were taken directly from legislation enacted as long ago as 1887, the congressman noted. With "cascading technology" including such things as microwaves, laser beams and optic fibers, existing regulations are in some cases obsolete and in other cases simply confusing and cumbersome because of the number of amendments enacted since the act's inception, he said.

"Even though Bell may have misgivings about opening itself up to all types of competition such as urban loops and other intruders, these are happening today," Van Deerlin said. Such things as microwave systems, Execunet and Wats systems have revolutionized bookkeeping and technology, he added.

Common Meet Set for October

DENVER — Common, the IBM users group, will hold its Fall '78 Conference at the Denver Marriott Oct. 15-18.

Sessions will feature user and IBM speakers on topics including DP management, data base management and manufacturing applications.

IBM development laboratory, regional and other high-level personnel will be present to respond to technical questions. Informal sessions to discuss problems of mutual interest for users are also being planned.

A DOS/VS Soundoff will provide users with an opportunity to ask questions, discuss problems and share experiences. An OS/DOS Forum is also being planned.

Another session on the agenda will present the features of the IBM Business System Plan, which is directed at building financial plans, budgets and cash flow forecasts for corporate planning and decision making.

Membership in Common now totals more than 800 installations which use IBM 3, 7, 32, 34, 370, 1130, 1800, 5100 and Series/1 computers.

More information on the Fall '78 Conference is available from G. Lister, Administrative Director, Common-Department F2, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

Van Deerlin said that the 1956 Consent Decree that bars AT&T from providing nonregulated services "makes no sense whatever 22 years later. Changes are what communications is all about.

"Such things as data transmission and electronic funds transfer will be the coming thing for AT&T, and the company will start putting its competitors on their toes," he predicted.

Western Electric View

Speaking of Western Electric, AT&T's manufacturing subsidiary, Van Deerlin said AT&T shouldn't manufacture equipment that it then sells to itself, nor should the same people sit on the boards of both companies because "that situation presents too

many opportunities to juggle figures." The thrust of the proposed act, which requires the divestiture of Western Electric, may be a telephone company no longer providing monopolistic services, he said.

With the FCC reduced in size and authority under the name of the Communications Regulatory Commission (CRC), as proposed by the rewrite [CW, June 12], Van Deerlin hopes to see license-granting deadlines "based not on years, but on months."

The draft law would rename the National Telecommunications and Information Administration (NTIA) in the Commerce Department the National Telecommunications Agency (NTA). Van Deerlin said another objective of the rewrite is to restore what would be-

come the NTA to the executive branch of the government.

"One good thing to come out of the Nixon Administration was an advisory agency within the executive offices to advise him on the fast-changing technology of communications," he observed.

While Van Deerlin admitted President Carter presently has more serious priority items on his desk, he hopes the rewrite bill will go before the Senate by next summer, with action taken by the end of 1979. He urged the UTC attendees to inform their congressional representatives of the legislation's dangers or ramifications unforeseen by the nontechnical lawmakers or, if no dangers exist, to assume an involvement in the issue.

Time is money.

Especially computer time

■ Fast Dump Restore

FDR with over 2000 users and nominated to the DATAPRO HONOR ROLL for the 4th consecutive year, has a proven record of RELIABILITY and EFFICIENCY. FDR permits the user more opportunity to backup his files while using significantly less CPU and elapsed time.

■ Data Set Functions

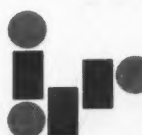
- DSF copies data sets faster than other utilities or user written programs.
- DSF can also selectively restore one or more data sets by name from either a DSF or full pack FDR dump tape.

■ Compaktor

- COMPAKTOR is a DISK MANAGEMENT UTILITY program which can reorganize disks at FDR speed.
- Merge multi-extent data sets into one extent.
- Data sets may be easily positioned by absolute or relative position, either singly or as a group.
- Ability to change both the size and location of the VTOC.

Available for IBM OS, VS and MVS

For Further Information
or Free 30 Day Trial, Call or Write.



**INNOVATION
DATA PROCESSING**

970 Clifton Avenue, Clifton, NJ 07013 • 201-777-1940



Editorial

Fundamental Confusion

The authors and enforcers of computer law may not know just what computing really is. Forthcoming litigation in more than one nation could result in a judicial definition of computing that does not quite jibe with the way most computing professionals see themselves.

To be specific, the courts may conclude that — at least as far as they are concerned — computing is a type of telecommunications.

Why? Because prosecutors are hard-pressed to find the jurisprudence needed to deter computer abuse and find that perhaps the only law able to do the job is telecommunications law generally written with something else in mind.

For example, Canadian federal prosecutors can apparently find no law on their books addressed to most types of computer abuse by name.

In March, Crown prosecutors charged three University of Alberta (UA) students with "theft of telecommunications services" and "mischief" for having allegedly issued themselves unauthorized UA computer accounts [CW, June 26].

The theft charge carries a maximum penalty of 10 years' imprisonment and is the principal offense to be considered when the students are tried in Edmonton, Alberta, this December.

Telecommunications theft is prohibited by Section 287 of the Canadian criminal code, a section generally regarded as written to deter "blue box" telephone tampering — use of a telephone in a way that precludes billing. Can 287 apply to computer abuse? Only if one assumes that computing is a kind of telecommunications.

Whether computing is a kind of telecommunications is a question worthy of philosophical examination, but it can also be seen as having very concrete significance in computer law and the way computing professionals see themselves.

Howard Anderson of The Yankee Group has said that in the 1980s computing will become a "subset" of the telecommunications industry [CW, June 12]. Interestingly, Anderson has assumed that the meaning of "computing" can change with time.

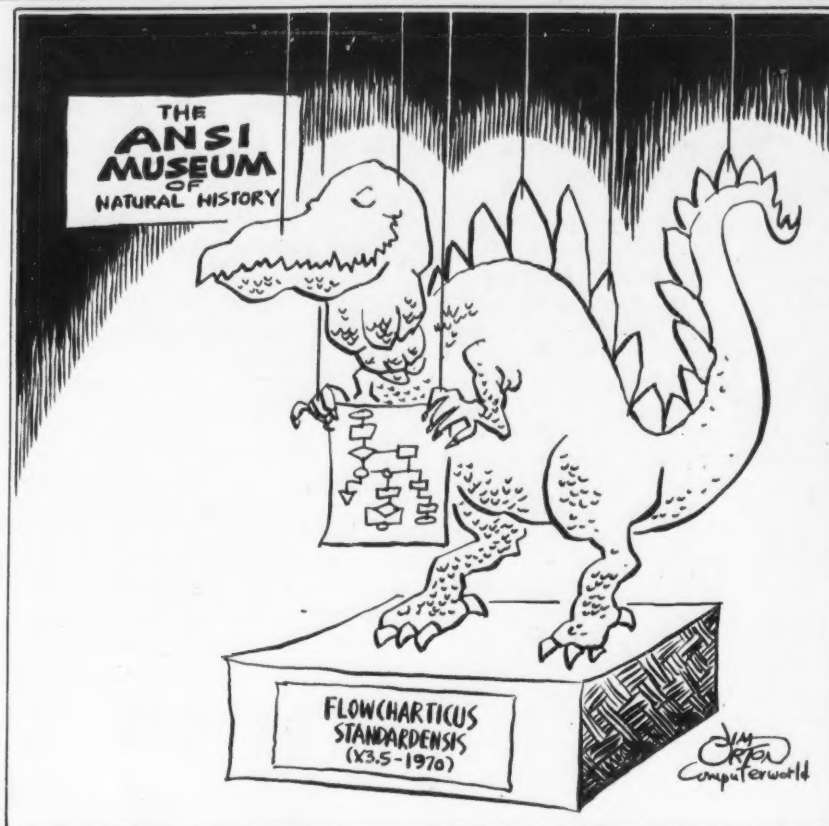
If the nature of computing does change with time, then computer law must allow for this change. It should not be swiftly obsolete by technological progress or economic developments.

U.S. law may have to be tested for its applicability in a very big way as the world's largest mainframe computer manufacturer enters the telecommunications marketplace.

Some see AT&T as being forced by IBM to counterattack with its proposed Bell Data Network. IBM and AT&T will compete for customers of controllers, multiplexers, front ends and smart terminal networks, the argument goes, and the distinction — if there every was one — between computing and telecommunications will thus be blurred.

The Justice Department's Anti-trust Division, however, may not quite see it that way, remembering the 1956 Consent Decree by which AT&T agreed to stay out of computing.

The UA case shows more than the inadequacy of Canadian, and by analogy, U.S. law in handling most computer abuse. It shows a fundamental confusion of self-identity in the computing community.



Letters to the Editor

Wrong About Proposition 13

Prof. Rob Kling missed the point of Proposition 13 ["Local DP Can't Take Budget Cuts," CW, June 19]. Who wants "inelastic" DP? Only the bureaucrats! Who wants more "intensive" DP? Only the bureaucrats! Who wants "convoluted" accounting? Only the bureaucrats!

Proposition 13 said "to hell with bureaucrats!"

Kling is obviously feeding at the public trough, and some consideration must be given to how that warps one's thinking. But that cannot excuse his absurd clichés.

Terrence M. Bezdek
Orinda, Calif.

Protestations 'Hogwash'

Regarding Prof. Rob Kling's protestations in "Local DP Can't Take Budget Cuts" [CW, June 19] that such cuts in a typical municipal or county DP operation "would have a devastating impact upon its ability to support current systems" and his statements about how "inelastic" and "complex" and "intensive" governmental systems are: Hogwash!

But then, what would you expect an entrenched academic on the public payroll to say? We will hear much moaning and groaning about such "devastation" in the coming months as the taxpayers' own solution to the backbreaking tax burden becomes implemented. We will also, I predict, scarcely be able to detect a disruptive ripple in the functioning of municipal and county government in California.

The bureaucrats had better face the fact that the trough is only going to be half full from now on.

Barry M. Walden
Portland, Maine

Time for Men to Change

I would like to take issue with Dr. Donnamarie E. White on her state-

ments with regard to developing an "authority image" to become a woman executive ["Debug Views on DP Careers, Women Urged," CW, June 19].

It appears White would advise women to be less than women in order to advance to executive roles. This seems like a very inoffensive way to obviate the problem of women being granted their rightful position in the working society. In fact, the whole thrust of the session was for women to aspire to only secondary-level executive positions. Women, according to White's theory, always have to have a male role model in place as president or chairman of the board.

If we do not study history, we are doomed to repeat its mistakes. For years, blacks emulated whites, attempting to get into the executive suite, and it gained them little because of racial prejudice. I submit that because of sexual prejudice, women emulating men will not do any more to get themselves into executive suites. White's advocacy of a thinly veiled "male, second-class" role for women in business is as "buggy" as a computer full of crickets.

Barbara M. Zuiderhof
LaPlata, Md.

'Honest Rapport' Necessary

"Debug Views on DP Careers, Women Urged" [CW, June 19] was an especially interesting article.

However, the comment about "wearing a wedding ring even if you are single" is ridiculous. I am starting to do outside selling and part of the selling process is developing an honest rapport with your customer. If you are a good salesperson, there will be some personal niceties exchanged between you and the customer.

By the way, should all single men wear a wedding band?

Annette Rosen
Fort Lee, N.J.

Data Past

Five Years Ago July 4, 1973

CHICAGO — The Institute for the Certification of Computer Professionals (ICCP) would be incorporated this month, organizing committee members said at the Data Processing Management Association's annual conference.

CINCINNATI — An appellate court here, upholding a lower court ruling ordered a Toledo gas company to enforce a personal notification system and rely less on its computer for billing. The class action suit against Columbia Gas of Ohio, Inc. had been filed more than a year earlier by Mr. and Mrs. Morris A. Palmer, who claimed their gas service had been terminated in violation of their constitutional right to due process. The original U.S. District Court ruling found that "significant and tragic mistakes" had been made by the company in keeping up with the payment or nonpayment of bills.

Eight Years Ago July 8, 1970

NEW YORK — IBM introduced the first two members of its 370 line, stressing hardware and software compatibility with 360s and more power for users. The 370/155 was described as having up to four times the internal operating speed of the 360/50, and the 370/165 was reported to operate five times faster than the 360/65.

CHICAGO — Three former computer operators of Encyclopaedia Britannica obtained and sold, without authorization, the company's confidential list of customers' names and addresses, the publisher charged in a suit filed in Cook County Circuit Court. The actual loss was estimated at more than \$3 million, and more than two million names and addresses on tape were allegedly involved.

COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress . . .
52 weeks of incisive news,
commentary and special
reports . . . subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:

- ☐ address
- ☐ title
- ☐ industry
- ☐ other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

Europe and Near East — \$75 All Other Foreign — \$125

ist four digits above your name)

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Mail To:					
City			State	Zip Code	

☐ Business

wish to receive

interested in receiving

COMPUTERWORLD

CIRCULATION DEPT 797 Washington Street, Newton, Mass. 02160

Detach here, fold, and place in post-paid envelope attached through binding.

The Human Connection Management Can Help Bored Programmer

By Jack Stone
And Irene S. Nesbit
Special to CW

Unfortunately, many a programmer spends much work time in a mode of restlessness, boredom and frustration.

Usually the bored programmer is one who has been directed into a programming maintenance function and committed to supporting a "critical" system over a long period of time. After suffering the agony of interpreting weird code early on and feeling a sense of being "locked in" to the task because the system has had no major catastrophes while he has "mother-henned" it, the programmer is now sitting across from your desk, asking for more "interesting" work. "That's it! I've had it! This system's old hat! The world of the new technology is passing me by, and I want a change!"

Irene Nesbit, an experienced manager of programmers and analysts, filed this report on her approach to this personnel situation.

Really good, experienced programmers are hard to find, and you certainly don't want to lose those currently on the staff. How do we keep our competent maintenance programming people? We've all found out the hard way that a sal-

ary increase won't solve a programmer's unhappiness for long, nor is a salary increase always feasible.

And "buying time" by delaying action can be dangerous — the risks are great that the programmer will leave for another job if a decent one comes along. Furthermore, you can't willy-nilly pull the person off the maintenance job in the short run, because the system really needs the "mother-hen's" tender loving care. And, finally, there is no other interesting work at the time — or is there?

Certainly there will be no task alternatives available unless you expend the effort to search for some. Here are some guidelines I have used in my searches which have provided me some measure of success.

Consult Programmer

First, it is very important that you involve the programmer in determining a course of action. Believe me, when the employee is participating in the process of finding more challenging work, he or she will come up with some very creative ideas. In certain cases, the mere act of focusing your attention on the programmer's personal needs tends to build momentum for

a successful answer to the quest and sometimes could lead to some rather imaginative solutions.

The next step is to discover what constitutes an "interesting" assignment. Just what does the programmer want or expect in the way of a task?

When I queried one programmer who came to me after many months of maintenance support of a large system, I learned that his notion of interesting work was to design systems to assess the quality of life on other planets. I looked out the window, thought about life on Mars for a moment and told him his current assignment was appropriate.

As I expected, he quit a short time later.

There are many programmers, however, who do have realistic job expectations and personal goals. These people, at certain points in their careers, do need different experiences and more challenging assignments. Toward this objective, it is important that the manager carefully plan choice assignments among all staff members.

One obvious approach is to enhance programmers' current responsibilities. Maybe the system could be modularly converted using one of the new tools or methodologies the programmer is itching to

try. Or perhaps the input processing or output formats could be redesigned — every system has a backlog of enhancements.

Another way is to document operational problems and maintenance modifications in such a way that a junior programmer, who might find the maintenance task to his liking, could take over the job.

For the programmer who is willing to carry an additional workload, there are more choices. I have found that nearly all programmers can find the time for a small but exciting task. Special tasks carried out in addition to the regular workload may indeed earn the programmer the right to be considered for more significant tasks on more creative projects. Perhaps challenging work rarely comes "free," but must be earned through exemplary performance.

Irene Nesbit is the deputy director of information systems for Mathematica Policy Research in Princeton, N.J. She was formerly associate department head in the Computer Services Department of the Rand Corp., Santa Monica, Calif.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Taylor Report Enforced Fraud Reporting Favored by Sen. Ribicoff

By Alan Taylor
Special to CW

Computer fraud may become more worrisome to some banks and other institutions if Sen. Abraham Ribicoff (D-Conn.) takes action on his opinion that reporting of such frauds should be made compulsory.

Currently, most computer frauds are not reported to the police. There are two reasons for this.

First it's hard to get the proof required by current law. The laws were not written with computers in mind and most people are still quite ignorant on the subject of DP.

But more important, computer frauds are often hushed up after the event. A vice-president who has taken a bank for \$100,000 or more may well be allowed to resign on any one of a number of grounds. The bank may want to avoid the embarrassment of revealing its system's vulnerability.

However, the situation may soon change. In response to a question at the EDP Auditors' Convention in Detroit in late June, Ribicoff came out clearly in favor of compulsory reporting of such thefts. The thefts to which he was referring are outlined in his bill, S.1766, which may soon be the basic computer law.

DP thefts are defined, quite widely, in two important sections. Anyone using a computer to "execute any scheme or artifice to defraud or to obtain money, property or services by means of false or fraudulent pretensions, representations or promises" falls under the act, and "services" are defined to include computer time, processing and any storage functions. Banks, although state-run, do not escape the bill's provisions.

S.1766 specifically covers any site involved in a "financial situation." This broad area would include banks insured by the Federal Deposit Insurance Corp., members of the Federal Reserve banks, institutions with accounts insured by the Federal Savings and Loan Insurance Corp., credit unions, federal home loan banks and securities concerns.

After his speech, the senator said the only thing he thought could hold up the bill was apathy. He urged people interested in preventing computer fraud to write their senators and congressmen in support of it.

During the auditors' meeting, Ribicoff picked up two new ideas as well as the one for the required reporting of computer crimes. The areas of software theft

(Continued on Page 14)

Reader Commentary Data Networks Created Out of Five Elements

By Jim Ryan
Special to CW

There seems to be a need to define just what data networks are because of the present tendency to mix data processing with data communications, probably because they use the same electronic control devices.

To begin with, networks are used to share information. That information may be restricted or public. It may also be live, interactive or stored and can be dynamic or static.

One of the most accepted means of sharing information is electronic communications. A telephone conversation is shared information in an analog, full-duplex, real-time mode, using the dynamic brain as a storage and manipulating device.

There are times when this needs to be supplemented by documentary evidence. A teletypewriter message is shared documentary conversation except that it requires much longer to transmit and receive because of the need for documentation and coding.

Data transmission commonly involves electronic storage and manipulation of the features found in telephone and teletypewriter information.

This means networks must usu-

ally be designed with specific applications in mind because of the various combinations of input, output, storage and manipulation involved.

'What-If' Question

When the design of a data network is considered, the first problem that surfaces is the 'what-if' question. This must be resolved quickly and the system's parameters should be set.

Let's explore a few simple "what ifs."

Using the elements described above, suppose a user wants to design a data network that will be public, real-time, on-line and use static information. This network would be accessed by customers dialing published telephone numbers and then following a standard published procedure to obtain the required information from a static file in the computer.

The network in this case would be the common carrier network and the principal problem to be addressed would be the capability of the computer controller to process the maximum number of simultaneous queries. This would be a network with public input, output and storage, but no

(Continued on Page 14)

Sets Back Thinking On Women in DP

"Debug Views on DP Careers, Women Urged" [CW, June 19] should go a long way in setting back liberal thinking in DP. While much included in the article bears credence, advice in the area of appropriate dress borders on the ridiculous.

A woman in management must project a professional image — that much is certain. But a woman need not sacrifice her femininity nor her marital status for the sake of her career.

A woman must learn to be tasteful, well-groomed and probably low-key in dress. She should not have to worry, however, that her next promotion will not be forthcoming because she carries a purse, is not married or is caught appearing feminine.

DP has always been a field in which women have had a relatively equal chance at career advance-

ment. To relegate fine female managers to the position of being more concerned over the length of their skirts than the professionalism of their duties is, at the very least, doing them great disservice. It is not only patently ridiculous, but also practically medieval.

Since 55% of the staff listed on the CW masthead is female, one would think that the publication would tend toward a more enlightened point of view. Although the opinions expressed may be those of Donnamarie White, they are certainly only that, and should not be

printed in the context of advisory information.

Carol S. Shaw

Greenwich, Conn.

Who Are 'Professionals'?

At a National Computer Conference seminar, Dr. Gary Casper reportedly warned of the need for DP self regulation/certification "Regulate Selves or Be Regulated, DPers Warned" [CW, June 19]. Some thoughts on his comments:

Who are these omnipotent "computer professionals" who should set

standards and test "competence"?

On what does he base his idea that we have "lagged so badly" in "enforcing high levels of professionalism" (whatever that is)?

Why does he assume incompetence apparently because all the doers haven't passed some esoteric certification test and been stamped "professional"? Has certification "prevented" incompetents from entering medicine, law, engineering or, yes, even the "DP seminar" arena?

I'll bet a lot of incompetents have pondered that last one in between dozing off at a lot of \$200-a-day-plus expenses disasters!

George L. Riege

Madison, Wis.

Letters to the Editor

Networks Built Around Five Elements

(Continued from Page 13)

manipulation. A second illustration would be almost the exact opposite, in which

the user would seek a restricted, real-time, on-line, dynamic stored information, manipulated system. In such an inventory control, only one user at a time could gain access to stored information, which could be updated by manipulation.

In this case, a private-line data network with all stations bridged along the line or at the controller would be the proper design. The controller would regulate which station gained access to the stored dynamic information.

Here are some basic guidelines in network design.

First, the tendency to mix data network control software with manipulator software should be avoided. With mini- and microcomputers, it becomes more feasible to keep these separated.

Second, all parts of the network system should be described in terms of five basic elements: terminals, controllers, concentrators, switches and facilities.

- A terminal is any location where input, output, storage and manipulation, or any combination of these features, may take place.

- The controller establishes a connection between two or more of the elements found in a terminal.

- The concentrator combines a number of terminals as in a telephone party line. (Combining a number of slow-speed lines into a high-speed line is multiplexing, not concentrating.)

- A switch establishes a connection between controllers.

- Facilities are the circuits used to interconnect all of the other elements.

Using this base, the network de-

signer would first determine the location of all possible terminals. Next, he would determine which of these terminals could efficiently use input, output, storage and manipulation features. All would use input and/or output, but the use of storage would be determined by the amount of information required by that specific location.

In general, the further from headquarters, the more detail would be required. This would become summarized as it moved up the hierarchical ladder to headquarters. The amount of manipulation would be related to the amount of storage.

Any terminal which could not qualify for all features would become a satellite of a location which did have all features. Data from low-volume terminals would be concentrated before reaching the base location.

Concentrators usually require careful study before being used. If the user can get through the concentrator, he may not be able to get through the controller to storage and manipulation. The penalty of service vs. cost is additive.

Controllers would be required at all fully equipped locations to ensure a disciplined use of input, output, storage and manipulation. They may be connected, depending on the amount of storage to be exchanged. Every effort should be made to keep the information static.

Switches are used to interconnect controllers when they do not need full-time interconnection. Controllers connected to a common switch can be connected to each other on an as-required basis.

Ryan is a retired DP user.

Fraud Reporting Urged

(Continued from Page 13)

and privacy problems in the detection of computer fraud also need to be treated.

The point on the software was left rather open and unexplained, but appears to deal with the question of whether copyrights provide sufficient protection for software — a knotty problem at best. The privacy question came up regarding discussion of exactly what files should be maintained and searched by auditors trying to detect fraud.

All in all, the situation appears to be that the first fundamental law

dealing with DP is about to be written into the codes of this country. What I find particularly remarkable about S.1766 is the comparative simplicity of its terms.

This country is acknowledging for the first time, how important computers are in the nation's affairs. The hearings are just beginning, so if you have any interest in the legislation's details, now is the time to contact your senator or congressman, or Sen. Ribicoff.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.



We've got an exciting ground floor opportunity for you to participate in the incredibly fast-growing retail personal computer business. We're Byte Industries, Incorporated™, and we're offering individual **Byte Shop™** franchises, nationwide.

As a Byte Shop franchisee you get:

- The nationally recognized **Byte Shop** trademark.
- A broad, full-line inventory of small-business and personal computer products.
- National and regional advertising support.
- Comprehensive technical and business management training, and on-going advisory services.
- Aid in local site selection, and professionally designed store interiors.
- Exclusive, protected territories.

To qualify, you should have an interest in computers, and a desire and ability to operate your own business. Retail experience and a sales background at management level is a plus. A theoretical or working knowledge of computer technology is helpful. Investment is roughly \$100,000 with an initial equity contribution of at least \$40,000.

If you're ready for your own business, and have what it takes, phone Dave Pava **now**.

Yes I'm interested. Please send me your franchise packet today.

Name _____ State _____ Zip _____
Address _____
City _____
Phone _____

Byte Industries, Incorporated
930 West Maude
Sunnyvale, CA 94086
(408) 739-8000

408-739-8000

Byte Industries™
Incorporated - A LOGIC Company

360, 370 Test Sites Report Move to Edos/VS Generally Goes Well

By Don Leavitt
CW Staff

RICHMOND, VA. — Edos/VS, announced last year by The Computer Software Co. (TCSC) as the "next logical extension" of its Extended DOS (Edos), has been delivered to beta test sites, and users in both IBM 360 and 370 environments have given the product — and its vendor — generally good marks.

Eric Robertson, systems programmer and operations supervisor at Brunswick Pulp and Paper in Brunswick, Ga., began moving Edos/VS onto his IBM 370/135 in February. He is very confident about the way the conversion is

going and the benefits Brunswick expects to gain from the enhanced operating system.

Also contacted at the recent Edos users meeting here, Bud Hampton and Roy Odom of Mead Packaging in Atlanta are moving more slowly in putting Edos/VS into live production on their IBM 360/50s, but they are also generally optimistic.

There have been "a few glitches," Hampton noted, "but that's to be expected and there's no hurry by Mead or TCSC to push the cutover."

Like Brunswick, Mead has been an Edos user for some time, and the existing system is working

well enough so no one is concerned.

Robertson said he experienced a smooth transition when he moved Edos and its workload from a 360/30 to the 135. And the move to Edos/VS earlier this year went equally well, he said, adding that production work in the evenings is already under the latest environment.

The system is running with five partitions and handling accounts payable, "wood accounting" and stores inventory.

The Proc Lib support was cited by Robertson as the best feature of the operating system, but he also said the Auto IPL is "great

for programmers coming in to work on weekends."

Robertson has found some problems in moving F Level Assembler subroutines to the new environment, apparently because of some change in the communications region, he said, but even this didn't strike him as a serious flaw.

Tricky Teleprocessing

Down at Mead, Hampton said one of the more significant problems he's encountered has been in his attempts at remote processing. With the initial Edos/VS distribution tape, "Btam and all other teleprocessing would crash" except in background. On the other hand, TCSC has said it now has a Btam fix ready, so he has hopes the problem is solved.

Hampton has been somewhat frustrated that Docs — which replaces a console typewriter with a CRT — won't work under Edos/VS and that its replacement — Asynchronous Operator Support — doesn't include job status displays.

But good features were much more on his mind as he discussed his situation. Auto IPL and the extended Proc Lib support are "far ahead of what IBM offers in OS," he said.

Wang VS Gets Accounting Modules

LOWELL, Mass. — Described as "one of the most interactive accounting systems available," a modular software package has been introduced by Wang Laboratories, Inc. for use on the Wang VS computer announced last fall.

An accounts receivable system is ready now. Accounts payable should be ready later this month and deliveries of the order entry, general ledger and payroll systems should start in August, September and October, respectively, a spokesman said.

Developed by MCBA of Los Angeles, the software "takes advantage of the Wang VS' extremely high level of interactivity" to shorten the learning curve and to simplify data entry. A single entry updates all appropriate records, making current information immediately available, the spokesman noted.

The modules reflect current approaches to the applications. The accounts receivable subsystem, for example, supports both open item and balance forward accounting, with the choice applicable by customer under user control.

The order entry module "naturally" includes inventory control and back-order processing, the spokesman said, and the payroll subsystem includes handling of taxes in multiple states and at multiple levels of taxing jurisdictions, from federal and state down to county and city, where applicable.

As with most payroll systems, this one is kept current — by MCBA.

Written in structured Cobol,

the accounting software can be run on Wang's minimum VS configuration with a 64K-byte memory and 10M-byte disk system supporting a single CRT.

The individual accounting applications are being made available through Wang's distributors and should cost no more than \$5,000 each, including "some modifications" for individual users, Wang said from One Industrial Ave., Lowell, Mass. 01851.

'Panexec' Adapted to DOS Setting

OAK BROOK, Ill. — A DOS version of Panexec, the executable program library management system now available from Pansophic Systems, Inc., gives users "virtually every beneficial feature" of IBM's OS merely by implementing the system, according to a Pansophic spokesman.

One of the most significant components of Panexec, he claimed, is the linkage editor that enables DOS users to perform some OS-like link-edit functions. But other link features are also unique to Panexec, he said.

For example, the Panexec linkage editor employs a program compression technique that eliminates defined storage areas to utilize disk space more efficiently.

DOS Panexec is said to capture 154 items of information — such as the names of all object modules linked to create an executable phase — and to provide a retrieval system, based on the company's Easytrieve package, to extract and study the data.

Source and executable cross-reference reports make it easy to

track problems in production programs, the spokesman asserted.

In contrast with IBM's conventional DOS, DOS Panexec has partition-independent file access capabilities. "Significant" improvements result because the user can have concurrent load functions to and from any partition, he continued.

The DOS Panexec costs \$18,000 or \$550/mo, Pansophic said from 709 Enterprise Drive, Oak Brook, Ill. 60521.

KNOW THE SCORE!

Fixed Asset Accounting Removes the Blindfold

When accounting users look after fixed assets, you can open their eyes to a much clearer picture. Just install the new Fixed Asset Accounting System, from Software International.

You'll be able to provide complete asset and property control data, consistent with latest accounting techniques. And our Fixed Asset Accounting System satisfies all IRS and SEC reporting requirements.

Best of all, Fixed Asset Accounting is from the leader in financial application software packages. More than 1400 major-league corporations around the world consider Software International the home team.

Give your users the Fixed Asset Accounting System. It's the heavy hitter that will make you a champion.



Before I swing and miss with a minor-league Fixed Asset Accounting System, tell me more about:

SMALL COMPUTER SYSTEMS ☐ General Ledger and Financial Reporting
☐ Accounts Payable ☐ Accounts Receivable ☐ Fixed Asset Accounting

LARGE COMPUTER SYSTEMS

Financial ☐ General Ledger and Financial Reporting ☐ Accounts Payable
☐ Accounts Receivable ☐ Fixed Asset Accounting
Manufacturing ☐ Material Requirements Planning
☐ Master Production Scheduling ☐ Capacity Planning
☐ Shop Floor Control ☐ Purchasing
Comprehensive Report Generator ☐ FILETAB

Name _____ Title _____
Company _____
Address _____ Phone _____
City _____ State _____ Zip _____
Computer System _____

SOFTWARE INTERNATIONAL

CW778

Elm Square, Andover, Mass. 01810 (617) 475-5040
Atlanta • New York • Washington, D.C. • Philadelphia • Chicago • San Diego
Toronto • Houston • Columbus, OH • San Francisco

Batch and Interactive More Systems Gain SPSS Versions

CHICAGO — Social scientists gained a broader range of equipment on which to analyze their work as SPSS, Inc. made two additions to the repertoire of machines that can handle its Statistical Programs for the Social Sciences (SPSS) package.

The batch version of SPSS has been adapted to run on Univac 90 series systems, including the recently announced 90/40, under OS/3, accord-

ing to an SPSS spokesman. The conversational version of the system (SCSS), already implemented on Digital Equipment Corp. Decsystem-20s, has been adapted to the Decsystem-10 as well, he said.

Listed as Release 7.2 of the G version of the batch system, the Univac implementation requires a 128K machine. All features of the original IBM 360/370 SPSS are supported, the spokes-

woman noted, except the ARCHIVE, MERGE FILE and SORT CASES commands.

In addition to the IBM and Univac mainframes, SPSS has also been run on DEC PDP-11s, Harris Corp. Slash 4 and Slash 7, Hewlett-Packard Co. 2000 and Interdata 7/32 and 8/32 minicomputers, the spokesman said.

Meanwhile, Release 2.2 of the conversational system requires "less than 70 pages" of memory on the Decsystem-10 and contains six major statistical procedures, he said.

Frequency tabulations; n-way cross-tabulations; descriptions of subpopulations including means, sums, standard deviations and variances; correlation; partial correlation; and multiple linear regression with forward, backward, true stepwise and direct solution methods are all built into the package, he claimed.

A file definition subsystem facilities to list attributes of data files and variables and facilities to create, revise or delete variables, to direct system output to off-line devices and to format the output to a variety of terminals are also available, the spokesman said.

SPSS for Univac gear costs \$5,000 (\$1,500 for nonprofit users, \$1,000 for academics), while SCSS for the Decsystem-10 costs \$4,000 (\$1,500 and \$1,000), he said from Suite 3300, 44 N. Michigan ave., Chicago, Ill. 60611.

Purchase Order Control Added to 'Accounting IV'

WOODLAND, HILLS, Calif. — A Purchase Order Commitment Module (POCM) introduced by Informatics, Inc. as an extension to its Accounting IV/Accounts Payable system is said to provide accounting and procurement organizations with a "greatly improved level of control" over the procurement process.

The basic system is capable of supporting multiple companies and processing all combinations of automatic payment, cash accounting or accrual account methods in one execution. The key module — the Monitor — retains options which include desired reports, accounting methods, forms control and integration techniques, a spokesman said.

Major features in the POCM include a three-way match of the purchase orders, receiving documents and vendor invoices; exception reporting of re-

ceiving and billing irregularities; and recognition and projection of cash requirements from the point of commitment, he explained.

The module fully integrates with the previous software through the creation of vouchers from vendor invoice, purchase order and receiving information, he said. It optionally generates purchase accruals for items received but not yet billed and enters them directly into the Accounting IV/General Ledger system.

With the module, the user can maintain the status of open purchase orders from a variety of perspectives, through a series of standard reports. On the other hand, the system, written in Cobol and costing \$13,000 in the U.S. and Canada, also includes a report writer facility for unique work.

Informatics is at 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

'FL/1' Eases File Handling

DON MILLS, Ont. — A file utility and reporting package said to combine various features of Cobol, PL/I, RPG and Assembler for IBM 360 and 370 and Univac 9400/9700 and 90 series programmers is available from Charco Consultants Ltd.

The FL/1 file utility and report writer combines file-handling capabilities such as automatic file merges, concatenation and device independence with report writing facilities, according to a spokesman.

FL/1 can access most commercial data base management systems including IBM's Bomp/Dbomp, DL/1 and IMS, as well as Cincom Systems, Inc.'s Total, he noted.

The package can be used with or without record layouts, the spokesman continued. It allows access to operating system-defined information such as record sizes, error codes and file audit trails.

FL/1's language includes all arithmetic operations, class test conditions, nested IF statements, structured coding verbs, automatic data type conversion and numeric checks on all arithmetic operations, the spokesman said. All exception conditions are annotated within the program.

The package, a "load-and-go" system, requires a minimum 64K bytes of storage, he added.

FL/1 sells for \$7,200, with enhancements and maintenance charges additional. Charco Consultants is at Suite 17, 1262 Don Mills Road, Don Mills, Ont. Can. M3B 2W7.

'Clue' Supports 360, 370 Usage

BETHESDA, Md. — The Compiler Language Utility Extension (Clue) package, introduced by U.S. Robots, Inc., was designed to provide IBM 360 and 370 OS programmers working in any language with access to system facilities previously accessible only through Assembly language coding.

Clue is composed of reentrant modules written in Assembly language with standard OS linkage conventions. In general, each deals with system functions or with general programming problems that confront the user, a spokesman said.

Examples include cataloging, uncataloging and renaming a data set; determining the amount of space left on a disk volume; attaching and detaching subtasks; reading and writing members of a partitioned data set; and abending a task or step.

General utility functions perform right and left justification of character strings, condense multiple spaces, locate the last nonblank character in an area and edit on-line terminal control characters, the spokesman continued.

Currently, more than 30 programs are available as part of the package and a list of additional considerations is under development, he added. Purchasers will receive all extensions and enhancements at no charge other than the 10% optional annual maintenance fee offered after the first year.

The package is available on a perpetual lease basis for \$3,000, which includes a one-year warranty. U.S. Robots is at 4901 Fairmont Ave., Bethesda, Md. 20014.

'UCC Fifteen' Now Backs 3850

DALLAS — Version 4.1 of the UCC Fifteen Job Recovery Management System from University Computing Co. (UCC) provides support for IBM 3850 mass storage devices.

It also offers more flexible options for assuring that production JCL isn't changed without a corresponding change in the UCC Fifteen data base, according to a spokeswoman.

The basic UCC Fifteen package was described as an automated means of handling jobs in an IBM OS or VS environment which need to be restarted or rerun for any reason, eliminating manual procedures.

With Version 4.1, the user can decide if additional generation data group (GDG) data sets are to be allowed on a rerun or restart condition. The user then has the option of abending the job or generating a report showing which additional GDGs were allowed, she said.

Version 4.1 is said to offer complete support of the IBM 3850 mass storage device; UCC Fifteen will now mount mass storage volumes to scratch and uncatalog the unwanted data sets, the spokeswoman explained.

Ready for delivery now, the enhanced UCC Fifteen costs \$9,250. It is also available under a 36-month full payout lease for \$360/mo, UCC said from 8303 Elmbrook Drive, Dallas, Texas 75247.

confused?

GET THE
COMPATABILITY
BROCHURE
FOR MAGNETIC
MEDIA

wabash

Compatibility

wabash

IT'S FREE: SO'S THE PHONE CALL

800-323-9868



Wherever it's said, however it's spelled, Informatics[®] fulfills the promise of the computer...universally!


Informatics...throughout the world, the word is synonymous with the ultimate in modern data processing. In the United States and many other countries, it means the people, products and services of Informatics Inc. Many people know us for our software products, such as MARK IV[®], or our information processing services. But we also provide a full range of professional services. Over 2,000 trained specialists available for information systems design, systems development, applications programming, management consulting, technical and managerial training, or full-scale facilities management. Informatics Inc., one of the world's leading independent sup-

pliers of software products and services. Drop us a line on your letterhead and we'll send you a colorful brochure that tells how we can help you fulfill the promise of *your* computer.

SOFTWARE PRODUCTS
PROFESSIONAL SERVICES
INFORMATION PROCESSING SERVICES

informatics inc 

Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473

Member SIA  Software Industry Association [®]U.S. registered service marks and trademarks of Informatics Inc.

Not So Mini Anymore — Part 1

Improving Software Puts New Light on Minis

By Don Leavitt
CW Staff

Minis aren't so mini anymore. Whether that statement alludes to the increased power and capabilities of minicomputers or to the no-longer inaccessible, no-longer almighty position of mainframes is a moot point. Minis aren't really just minis anymore. There has been a migration of applications from the mainframes to the minis for several years. And it's growing.

As mainframe users become more used to the idea of mixing vendors within individual, integrated processor systems, the idea of turning to other vendors for complete minisystems — which are to be part of distributed processing networks, used as on-line transaction systems, used for offloading the mainframes or for use in program development — is not nearly as foreboding a prospect today as the mixed-vendor idea was in the '60s.

People believe mini hardware is powerful and inexpensive. We all have heard and believe that hardware costs are continually going down and that minis represent the way to realize hardware savings.

But what about software? Is the software any good? Does it provide the same capabilities to which the user is accustomed on his mainframe? Will he need high-powered system designers and programmers to design and produce many of the tools the mainframes provide?

Will the Cobol programmers be able to interface directly with these machines or will they need to learn another language, new protocols and so forth? Is the computer architecture or programming language(s) similar to what he is familiar with and are application programs "portable"?

Those are real worries, and in the past they were real problems. But today there are solutions to these problems and every day minicomputers become a more viable solution for commercial business problems. Answers to the questions posed above are more than encouraging — they are exciting, for in several instances, the mini today outperforms the mainframe!

Getting Better

The software is good and getting better. In some cases, mini software provides tools the business user doesn't have on mainframes.

OEM expertise is no longer the only way to utilize minis effectively. Cobol application programs will be tested, debugged and placed into production without the programmer having to know he's now dealing with a minicomputer.

The engineering orientation previously associated with minicomputer manufacturers has been influenced and changed by the people who market these products. The tremendous potential in the commercial business DP arena is recognized by minimakers.

The changing orientation of the manufacturers has allowed them to address the concerns and requirements of the commercial business world. The fact that mini manufacturers are "late" in the business software area in some respects is an advantage! They are able to observe and avoid the design and implementation errors of others.

They've learned from the experiences of the mainframers, and the user benefits. Very good file management methods have evolved on the minicomputers and excellent program development software is available.

Minicomputers, which traditionally operated in real-time environments, are providing on-line, multiterminal, multiprocessing transaction-oriented support for users having only Cobol programmers. Packaged and turnkey systems are being offered to put the user at ease and to remove him from the OEM environment where pieces are sold separately and often not "off-the-shelf."

Everyone is conscious of the rising cost of labor. Minicomputer manufacturers recognize that the only way to minimize software development costs for both commercial business and OEM users is by offering more end-user-oriented software tools.

Software is highly important to the user trying to present a good return on investment for a proposed system. Equally important is the ease of learning how to work with a new system and what the project of conversion ef-

fort will cost — in time as well as money.

Finally, the mainframe user is keenly aware of the service he has received — both in hardware and software. The user contemplating use of minis expects the rapid response to which he is accustomed.

Minicomputer manufacturers have begun addressing these problems successfully with standard contracts, first-shift response capabilities and customer-oriented services that include pre-installation planning, start-up assistance, on-site service personnel and various other "mainframe-like" services.

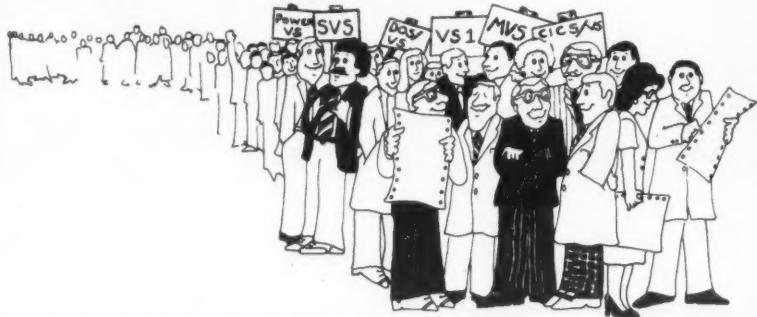
Truly, minis aren't so mini anymore. Just as their hardware capabilities caught up with those of the mainframe, now minicomputer software service capabilities are also maturing.

In the next several weeks, a series of articles will examine many facets of minicomputer software. In some instances, these capabilities will be compared with services available to the mainframe user in the commercial business environment. The series will look at CICS-like transaction processing packages.

Following that will be a discussion of the on-line program development features offered with the multiterminal support packages. Next, the series will take a close look at microcoding, various languages and utilities and the strengths of minicomputer operating systems.

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone (____) _____

Computer _____ Operating System _____

CW703

**Johnson
Systems, Inc.**

8400 Westpark Drive
McLean, Virginia 22101 (703) 893-8700

Semi-Automated Scheduler Eases DP Center Planning

COSTA MESA, Calif. — Simplifying the operational scheduling of a DP center but leaving most of the data gathering up to the user, the Jobsched package from Management Systems Corp. is currently in use on Burroughs Corp., IBM and Univac systems, according to a spokesman.

Written and distributed in ANS Cobol, the package works with user-provided descriptions of what runs have to be run and when, including day of the week, day or date during the month and time of day.

Time to start production and deadline for completion can be included in the input, the spokesman noted. From all that information the system produces a printout showing the time and order in which jobs should be run on any given day of the month.

Jobsched is a simplistic tool, he ad-

mitted. The user must determine job dependencies and set times on the input cards so the proper run sequences can be maintained.

Despite its basic simplicity, however, Jobsched reportedly has enough sophistication to adapt the generated schedule to actual conditions perhaps unanticipated by the user. Work normally to be run on a Monday, for example, will be moved to another day — normally the next day — if the Monday is a holiday.

The format of the printed schedule is determined by the user and new input can be prepared and entered without disturbing the basic system, the spokesman said.

The package, including source code, is available for \$995 from the vendor at 3198 "B" Airport Loop Drive, Costa Mesa, Calif. 92626.

FP Package Runs on Novas

HORSHAM, Pa. — A floating point software package now available from Complete Computer Systems is said to provide double precision support for any Data General Corp. Nova or compatible minicomputer and at a 300% dollar savings over DG's hardware version.

Available on both magnetic and paper tape, the Floating Point Utility (FPU) occupies 2,500 more bytes than the software accompanying DG's double precision product. But, a spokes-

man claimed, the package "more than makes up for that" by saving the two chassis slots required by the hardware version.

14-Place Precision

Use of the Complete facility permits a minimum of 14-place precision in numeric operations, he asserted. FPU, including documentation, is available under license for a one-time charge of \$1,000, the vendor said from 159 Gibraltar Road, Horsham, Pa. 19044.

Packages Keep Work on Time at Navy Center

Special to CW

WASHINGTON, D.C. — One of six such facilities in the country, the Navy Regional Data Automation Center here provides DP services to the U.S. Navy in the Capitol region. Staffed by some 2,000 people working in three shifts six days a week, the facility is equipped with 10 large-scale IBM, Univac and Honeywell Information Systems, Inc. mainframes.

Scheduling for the IBM systems — a 370/165 and a 360/65 using shared disks under MVT and Hasp — was becoming more of a challenge, according to Charles Bridges, production control officer for that part of the center.

"We would have a list of the jobs that had to be accomplished, but no accurate idea of what a good mix would be," he recalled. "The jobs got in and the jobs got out, but there was no way of seeing if this was the optimum procedure."

"Nor was there any way to project peak loads or show management the trade-offs that would be possible if jobs were processed in a different priority sequence, Bridges continued. "It's one thing to say arbitrarily that a certain job has to be done four hours earlier if it is to be completed when required, but we wanted a system under which, by assigning jobs certain priorities and processing them in this specific sequence, we could demonstrate what could be achieved within the specified time limits," he added.

Scheduling System

The first step toward realizing this goal was the introduction about two years ago of the Data Center Scheduling System from Value Computing, Inc. (VCI). The data base for the system is created from information that is produced and automatically logged by the current operating system.

This keeps the data base current by reflecting changes in run time, additional programs and changes in program and hardware, Bridges noted.

Once the scheduling data base was loaded, resource requirements were added to the job profiles, as were due-out times, concurrency requirements, run frequencies and predecessor relationships.

"Each Friday, the workload planner produces schedules and projects job arrivals and processing for the following week," Bridges reported. "Thus, for each day we have a detailed road-map showing exactly which jobs are expected and how to run each job or application."

"Since the system looks ahead this way, it produces a job mix that gives best usage for the equipment. Schedulers update these projections to arrive at a final daily schedule for all on and off line processing."

A year ago, with the scheduling system in operation, the facility then installed the Status and Revision Subsystem (Stars), an extension provided by VCI. This system takes as its primary input the detailed schedules produced by the scheduling system, provides automatic feedback on all CPU jobs and reduces the rescheduling process so realistic plans are available at all times at the facility.

Stars also addresses job tracking and status on all non-CPU work centers.

"Stars enables each operator to ask over a CRT which job he is to initiate next," Bridges stated. "It takes away the paperwork involvement, gives the operator better quality information immediately and provides leeway for the superior operator."

"The two shift administrators use it regularly, but each operator has access to it. "It's a flexible real-time status system as opposed to a static hard-copy report," he explained.

Labor-Intensive Tools

In addition to immediate scheduling and information benefits, the system and its enhancement are alerting the facility to problems that may arise. "It's a management tool that enables you to look ahead and to plan for more effective performance," Bridges said.

On the other hand, he added recently, both the scheduling system and Stars are more labor-intensive than many people imagine. As workloads change — and the center is experiencing a 50% increase each year — at least two spe-

cialists are required to enter manual changes.

These include changes in the dependency patterns among programs and JCL procedure changes, he said. Although JCL seems straightforward, "one of our people has to review each change to determine how it will impact the system."

The center is currently installing VCI's Apollo package, which releases JCL according to predetermined criteria. With this latest acquisition, Bridges is now receiving update tapes from the vendor about every three weeks, and installing them costs manpower, too. But it's worth it, he said, noting the advantages provided by the packages more than offset the effort needed to keep up with them.

PERIPHERALS FOR LEASE



ALANTHUS LEASING COMPANY can offer you a customized short term operating lease on IBM and plug compatible peripheral equipment. And provide you with substantial savings.

Flexibility is our hallmark. Your particular corporate requirements will be met with a lease that will satisfy these specific needs. ALANTHUS has over \$225 million in computer and peripheral equipment on lease in the United States and overseas, generating savings of more than \$17 million annually. We invest in and own a large share of our equipment so we are not simply "packagers" who work for a front-end fee and then disappear.

Whether you are thinking about purchasing or leasing new computer equipment or adding on additional IBM or plug compatible peripheral equipment, call ALANTHUS. We have the ability and the resources to provide you with the best leasing program to solve your particular corporate needs.

alanthus leasing company

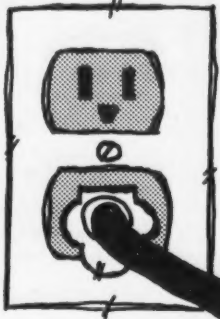
111 High Ridge Road
Stamford, Connecticut 06905
203-348-4820

Mid West Region
Northeast Region
Southeast Region
Western Region

Tony Saladino 203-348-4820
Larry Bender 203-348-4820
Bob Farmery 404-955-7438
Bill Kennedy 415-362-1218



THE \$99 MODEM*



If you don't need dial-up and you're looking for an inexpensive local or in-house communication link that's RS-232 compatible, then consider a pair of our M-1 asynchronous short haul modems. Purdue University, Princeton University, NASA, the U.S. Navy and many others have found that our M-1's are a cost effective way to solve communication problems up to 10 miles or 9600 bps.

Rack mount configuration is available too. If you need synchronous transmission ask about our M-2 synchronous short haul modem.

bo-sherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

Write or call us now
for a data sheet
and complete price
information.

*100 Quantity

Study Finds Employers With Rigid Hiring Rules May Lose Promising DPer

By Jack M. Wolfe
Special to CW

Although there is a growing pattern of businesses looking for people with a college degree as a prerequisite for programming work, and a degree in computer science as an optimal prerequisite, there is also evidence that such a background is not necessarily a guarantee of success in the field.

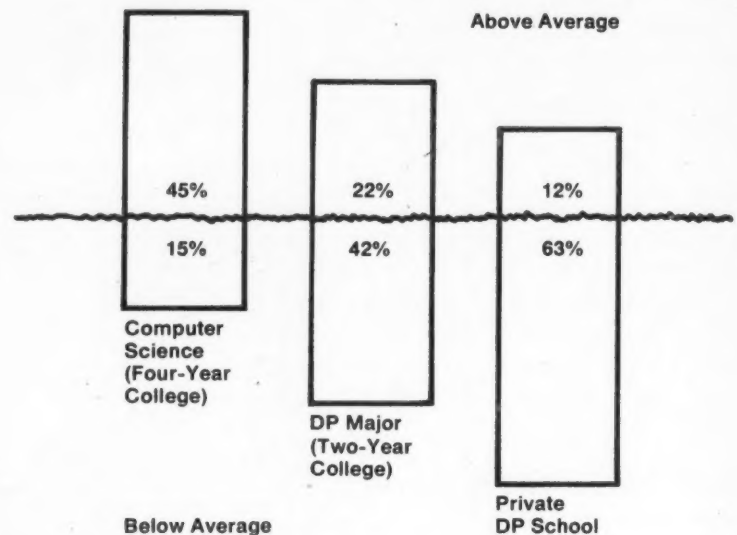
It's been said before, but bears repeating, that a range of factors has to be considered in screening job candidates. Programming talent is where you find it, but sometimes it takes some digging.

For example, in 1977 the Aptitude Assessment Battery: Programming Test — an evaluation tool developed more than 19 years ago and validated

tom 15% of the more highly trained computer science graduates.

Even if the employer eliminates from further consideration those computer science graduates with below average performance on its screening aptitude test, but limits his recruits to the best group, that is, the computer science group, he will have let the most superior applicants from the other groups slip through his fingers. This is neither in the best interests of the company nor fair to the applicants, some of whom have the mental attributes for successful work in programming.

To ensure that the best candidates are not overlooked just because of their educational background, I believe it would be wise for a company to select trainees from the three groups in ap-



Members of all three groups scored above average in the test, according to Wolfe's 1977 study.

by a federal agency in 1974 — was administered to 465 persons with computer-oriented educations. The test was given in 65 companies and government agencies, 49 in the U.S. and 16 in Canada.

The figure above shows the percentages rated above and below average from the three groups illustrated. The persons included in this study had just completed their computer-oriented education and were applying for their first position in programming.

The computer science majors with a regular four-year degree showed a higher potential for successful programming work than the graduates of two-year community colleges who had specialized in DP. The latter, in turn, showed better potential than those who had completed a course of study at a private DP school.

The personnel officer must be very careful, however, in interpreting these results. There is substantial overlapping in the capabilities of the persons in these three groups.

Although the four-year computer science group is far superior to the private DP school group when considered as groups, 15% of the superior group were not recommended for employment. More than one-third of the private DP school group showed better performance on the test than the bot-

proximately the same proportion as the group members scored above average in the 1977 test.

For example, a company about to start a training class with, say, 10 trainees having prior education but no work experience in programming should use its screening procedures to select the top six applicants of those with a four-year degree and a major in computer science; the top three persons of those with a two-year degree in DP; and the top individual applicant who completed a course of study at a private DP school.

In some cases, of course, the proportional number of applicants from any group may not be hired because of the requirements of the screening test. In such cases, the standards of the company should be maintained and the additional applicants should be chosen from the groups that do have qualified applicants.

In summary: No one group with a specific educational background has a monopoly on computer talent, although some groups have more of it than others.

Wolfe is a professor in the Department of Computer and Information Science at Brooklyn College, part of the City University of New York, and the developer of the Aptitude Assessment Battery: Programmer Test.

TERMINALS BUY OR LEASE!

ALL LEASES: 3-MO. MINIMUM

VIDEO

	BUY	MONTH LEASE
HAZELTINE		
1000 ... 12x80	\$ 495	\$ 35
1200 ... 24x80	750	50
2000 ... 27x74	995	70
3000 ... 27x74	1500	100
THERMAL PRINTER	795	55
DUAL CASSETTE	1395	90

DEC

VT50HA DECSCOPE 12x80 ... \$ 995 \$ 70

LEAR SIEGLER

ADM-3A "NEW" 24x80 \$ 845 \$ 60

HARD-COPY

	BUY	MONTH LEASE
DEC "NEW"		
LA36 DECWRITER II	\$1495	\$ 80
LS120 DECWRITER III	2695	160

OLIVETTI "NEW"

TC480 "PT & CASSETTE I/O" .. —CALL—

TELETYPE "NEW"

43 TELEPRINTER \$1175 | \$ 70 |

CENTRONICS

101A ... 165 CPS, TTL	\$1395	\$100
102A ... 330 CPS, TTL	1895	125
103 ... 165 CPS, LSI	1695	115

- "NEW" UNITS CARRY MANUFACTURER'S WARRANTY
- ALL REFURBISHED UNITS CARRY 90-DAY WARRANTY

AMERICAN USED COMPUTER • 617-261-1100

P.O. BOX 68, KENMORE STATION, BOSTON, MASS 02215

Terminal Vendors Lack Software, Users Report

By Ronald A. Frank
CW Staff

DELRAN, N.J. — Users of CRT terminals feel that software and technical support is one of the weakest areas of terminal vendors.

This was one of the conclusions of a recent Datapro Research Corp. study on alphanumeric display terminals.

The survey was based on 742 responses rating 20,000 installed terminals. Weighted averages were assigned to IBM displays and non-IBM displays, although the general level of satisfaction was about the same regardless of vendor.

In the IBM category, overall performance, ease of operation, keyboard usability, hardware reliability and maintenance all scored 3.4 out of a possible 4. Software and technical support and display clarity were rated 3.1.

Non-IBM displays rated somewhat lower with performance, operation and display clarity receiving 3.3. Hardware reliability had a 3.2 score and keyboard usability was rated 3.1 with maintenance at 3. Software and technical support was lowest at 2.7, according to the survey.

In the rating of overall performance according to vendor, five firms scored a 3.7. These were Datamedia Corp., Genesis One Computer Corp., Raytheon Data Systems Co., Teletype Corp. and Teleray. Three vendors — Control Data Corp., Omron Electronics, Inc. and Trivex, Inc. — were close behind with a 3.6, while four suppliers — Datapoint Corp., Honeywell Information Systems, Inc., IBM and Lear Siegler, Inc. — scored 3.4.

It should be pointed out that responses for IBM equipment totaled 244, while all other vendors had fewer than 25 re-

sponses, each. CDC, Omron and Trivex were represented by five responses.

In type of usage, 68% of the respondents said they had at least some terminals operating remotely via communications lines. But 66% said they also had directly connected CRTs operating in local mode to a CPU. Terminal access to a central data base was a characteristic of 66% of the CRTs.

Those users who used their CRTs as plug-compatible replacements fell mostly into two categories. About 33% said their terminals were replacements for the IBM 3270/3275 and 23% said they were replacing Model 33 and Model 35 Teletype units.

The complete report, "All About Alphanumeric Display Terminals," is available for \$12 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Firm Using PBX, Switch Least-Cost Routing Saves \$133,000/Year

Special to CW

ST. LOUIS — Kellwood Co., a manufacturer of consumer products, has for the past four years routed all data as well as voice traffic through PBX telephone systems, and for the last 18 months, that data has also been routed through a long distance control system at speeds of 4,800 bit/sec to 9,600 bit/sec with no quality degradation and with significant cost savings.

"More than 40% of our long-distance usage stems from data transmissions between our various facilities," Kerry Stewart, Kellwood's telecommunications manager, said. "Being able to transmit our data traffic over the same least-cost facilities that we use for voice traffic has allowed us to save \$70,000 in the first year alone."

"Now with the Datapoint Corp. Infoswitch control system we have cut our costs an additional \$63,000 per year," he said.

Stewart dismissed the idea of having separate telecommunications networks for voice and data traffic as an unnecessary and redundant expense. "As far as I am concerned, with today's modems, there is no good reason a company cannot route all telecommunications traffic through a PBX and a least-cost routing switch to take advantage of economies of scale. Normally, if you can talk on it, you can transmit on it."

"Much of our data traffic occurs at night, which lets us get high usage out of our Wats lines. For example, with Infoswitch's help at 'packing,' we have achieved as much as 435 hours usage on one of our Wats lines. We normally average 230 to 250 hours per trunk on our full business day Wats circuits," he reported.

In May of 1978, for example, Kellwood transmitted data for a total of 938 hours, or 8,790 data calls. This amounted to 45% of the total telecommunications usage.

PBX Use Satisfactory

"And there is no problem transmitting at the high speeds we require because of our Stromberg Carlson PBX and the Infoswitch," Stewart added. "We recently began transmitting at 9,600 bit/sec using a two-call dial-up procedure. The only problem was a minor data terminal software problem, which was resolved by the terminal vendor."

"Most people are afraid to transmit data through a PBX. They often are told by their vendors, as we were, to use separate Wats facilities or conditioned private-line circuits

to transmit data. We decided to try transmitting through Stromberg Carlson E120 and Crossreed 800 PBX systems anyway and have had no problems for the last four years."

Kellwood's data communications network provides communications between Mohawk Data Sciences Corp. 2400 systems at 27 remote divisional offices and a Mohawk 2400 at Kellwood's headquarters in St. Louis, Mo. Data is then gathered on tape and run on Kellwood's IBM 370/158. This telecommunications network provides Kellwood with a centralized DP system including payroll, accounting and raw material inventory control.

Because Kellwood is the largest supplier of soft goods to Sears, Roebuck and Co., the IBM 370/158 communicates with Sears' IBM 370s in Chicago. The information transmitted lets Kellwood automatically produce shipping tickets to fill Sears' orders.

"Telecommunications is essential to the day-to-day operation of this company," Stewart said. "That's why it is essential that we try to save as much money in that area as possible. A great money saver is the routing of data traffic through the PBX instead of dedicated lines. A second money saver is the Infoswitch system."

The Infoswitch combines voice and data

traffic over the same low-cost lines, controlling access, automatically queuing and selecting the least-cost route for every call and individualizing the billing for all long-distance facilities usage.

The system is compatible with any standard PBX or Centrex facility. While the system installed at Kellwood handles as many as 13 outgoing telephone trunks, Infoswitch systems can be configured to accommodate anywhere from six to 83 outgoing trunks.

The Infoswitch system installed at Kellwood consists of a Datapoint business computer with 48K of user memory, a 5M-byte cartridge disk unit for program and accounting data storage, an 80 char./sec Datapoint Freedom printer for permanent copy report generation, an intelligent real-time controller that manages all the details of call placement and a magnetically latching reed relay matrix for telephone line interfacing and switching.

"The reed-relay technology used in the Infoswitch system ensures there is no decibel loss when data is put through the switch," Stewart said. "Therefore, we did not have any data transmission problems when the Infoswitch was installed."

"Our experience proves that data and voice
(Continued on Page 22)

Two Protocols Back V77 Use In Nets With Univac Hosts

BLUE BELL, Pa. — Univac has begun to integrate the capabilities of Varian minicomputers (now owned by Univac) with its mainframe systems with the introduction of two communications protocols for the V77 processor series.

Support has been added to allow Uniscope terminals and software to operate with the V77 in distributed systems that can also communicate with Univac host CPUs. The Univac 1004 remote-batch protocol capability allows the V77 to be linked to distributed networks that include both V77s and host CPUs, the firm said.

The hardware and software base provide the means by which interactive and batch processing can be performed locally. In a distributed environment, users and applications can be linked to remote hosts interactively or in a batch mode.

The protocols operate with the general-purpose transaction monitor Pronto, which

runs under the Univac Vortex II multitasking operating system, enabling a user to run multiple real-time tasks and a batch job stream simultaneously. Pronto has been installed in networks using IBM 3270 protocols, operating as V77 networks and as stand-alone transaction processing systems.

In conjunction with Pronto, Vortex II supports a number of systems software packages including Cincom Systems, Inc.'s Total, a data base management package. Also supported are Cobol, Fortran and RPG-II compilers.

The V77 also has a large instruction set with special instructions for processing bytes and multiple words; a 190-nsec writable control store for Fortran and Cobol/Total firmware accelerators, and user micro-programming.

The Pronto software adds Uniscope capability to the earlier IBM 3270 capability. The Univac access module costs \$6,000.

COMMUNICATIONS

CA Offers Front-End Micros for Syfa Systems

IRVINE, Calif. — A family of five front-end microprocessors designed to further distribute intelligence within the Virtual Network system has been unveiled by the Commercial Systems Division of Computer Automation, Inc.

Called the Syfa Microboosters, these front-end processors were originally introduced as integral components of the company's recently announced Virtual Network architecture. The company is now "unbundling" the Microboosters, making the units available for use on earlier Syfa systems. This is said to provide modularity to facilitate the phased implementation of the Virtual Network architecture.

The Microboosters increase the number of peripheral devices supported. The number of terminals supported has increased from 24 to 32, the number of line printers has doubled from two to four and the number of synchronous communications lines has increased from one to two, according to a spokesman.

The family includes the asynchronous Microbooster, the line printer Microbooster, the bisynchronous Microbooster, the Synchronous Data Link Control (SDLC) Microbooster and the distributed data base Microbooster. Each unit is equipped with 16K of dedicated random-access memory.

Spoiled line printer support is doubled by the line printer Microbooster, which offloads line formatting, space decomposition and insertion and tabulating functions from the Syfa processor, CA added.

Switch Cuts Firm's Costs

(Continued from Page 21) traffic can be centralized over the same PBX and intelligent system regardless of what a telco representative or computer representative might say," he added.

"If there is a problem, users should check the transmit levels of the modem, as there is a 2 db loss when a telephone company data access arrangement is used. If this problem does occur, quite simply, the user can make the modem talk louder," he advised.



The bisynchronous Microbooster, when used in combination with emulation software executed in the Syfa network processor's main memory, reportedly makes the system appear to a mainframe as any one of four terminal devices: an IBM 3270, IBM 2780, IBM 3780 or IBM Hasp/20 workstation.

The SDLC Microbooster provides Syfa users with full Systems Network Architec-

ture (SNA)/SDLC in a 3790 communications compatible mode. This Microbooster approach to SDLC, CA said, permits the firm to emulate future SNA products by writing additional emulation software to operate in conjunction with the SDLC Microbooster. The Microbooster performs bit stuffing, cyclic redundancy and message framing functions, with transmission speeds to 9,600 bit/sec in full-

duplex operation.

The distributed data base Microbooster provides a second synchronous communications link, thereby serving as the interface between the Syfa network processor and the Virtual Network, utilizing X.25 communications protocol. Virtual Network architecture interconnects geographically distributed data bases of an entire Syfa network, making all data files available to

any Syfa processor, CA said.

The bisynchronous Microbooster, line printer Microbooster, SDLC Microbooster, distributed data base Microbooster and eight-port asynchronous Microbooster sell for \$7,500 each. The basic eight-port asynchronous Microbooster can be expanded to 32 terminal ports in eight-port increments.

CA is at 18651 Von Karman, Irvine, Calif. 92713.

Hard copy made easy.

With the help of a high-speed microprocessor, Hewlett-Packard combines exceptional performance and convenience in a new low-cost printer and printing terminal.

The HP 2631A printer and HP 2635A printing terminal with alphanumeric keyboard are the first members of a new Hewlett-Packard family of hard copy terminals.

Each machine was designed to give you a number of high-performance features. And both can support a variety of interfaces, including RS232 and CCITT V24, to fit into systems made by HP and other manufacturers.

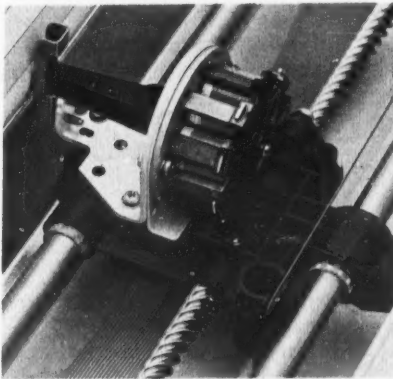
Bi-directional printing increases throughput. Both printers zip along at 180 cps in both directions, depending on your line layout. The microprocessor chooses the quickest path, and increases the speed even more by suppressing leading and trailing blanks.

High-speed slew for columnar data. When the microprocessor senses more than ten blanks in a row, it slews the print head at 45 inches per second to the next print position.

Three ways to print. The Character Compress/Expand Modes let you print more data on a page and emphasize points with headlines and titles. You can get as many as 132 characters on an 8-inch line, or 227 on a 14-inch line.

High-quality print, with six copy resolution. A 7 x 9 dot matrix (versus the usual 7 x 7) gives you clear, crisp printouts, right down to the sixth copy and meets the 128-character USASCII standard. And the extra two dot rows allow true underlining and descenders without character blurring.

Programmably interchangeable character sets. The HP 2631 can be made to print alternate character sets without reconfiguring the printer.



Long-life cartridge ribbon for a clean change. With a life span of at least 10 million characters, this innovative drop-in cartridge takes the mess and trouble out of ribbon changes.



Self-test for quick status checks. One key tells you if the printer is ready to go. If it isn't, the self-test feature helps you isolate the problem, reducing the time and cost for repairs.

Run everything under program control. All the features described and more can be programmably controlled. The software can take you in and out of the various modes. Or you can make a change yourself using one of the front panel switches or keys.

In a network or as part of a stand-alone system, HP now makes it simple to get the hard copy you need. If you'd like to see our printer or printing terminal in action, call the Hewlett-Packard sales office listed in the White Pages and ask for a computer systems representative. Or send us the coupon.

Long lasting, quick change print head saves service calls. The 9 wire print head is conservatively rated at a 100 million character life-span. It's also self-aligning. When you finally replace the head, you can do it yourself in a couple of minutes.

Yes, I'm interested in your new

- ☐ Printer ☐ Printing Terminal.
☐ Have your representative contact me.
☐ Send me more information.
☐ Send me OEM information.

Name _____ Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____

Mail to: Bill Murphy, Marketing Manager, P.O. Box 15,
 Dept. 319, 11311 Chinden Blvd., Boise, Idaho 83707

With Independent Page Protection Lear Siegler Adds Micro-Based, Smart CRTs

ANAHEIM, Calif. — Two microprocessor-based, intelligent CRT terminals have been introduced by Lear Siegler, Inc.'s Data Products Division.

The ADM-31 offers two 1,920-character pages of CRT display, each with independent data and format protection characteristics. If the operator changes to another page, a page's attributes are

stored in memory and recalled as they were when that page is later readdressed, according to a spokesman.

The ADM-31 is self-contained and comes equipped with keyboard, control logic, character generator, refresh memory and interface.

The keyboard is said to be integrated with main logic and able to generate a full 128 As-

cii character set, including upper and lower case alphas, numerics, punctuation and control characters. It features numeric keypad with period, comma, tab, minus and numerals arranged in calculator format.

The ADM-31's editing capabilities allow the user to clear the screen or use a destructive cursor for character change. A

read and load cursor permits sensing of the current address and direct, absolute addressing to any page and any X-Y coordinate, the vendor said.

Besides storing control characters, the ADM-31 allows the operator to skip protected fields, backspace, move up, move down, return and reach a new line, the firm added.

The ADM-31 features a

high-resolution, 12-in. diagonal CRT screen able to depict 24 lines of 80 characters in a 7 by 9 dot matrix, the spokesman said. Supporting transmission rates ranging from 50- to 9,600 bit/sec and upwardly compatible with LSI's earlier Model ADM-1A, the ADM-31 costs \$1,450.

Eight Pages of Memory

The second terminal unveiled was the ADM-42, which features up to eight pages of memory, 16 function keys and added flexibility in formatting, editing, interfacing and transmission, according to the spokesman.

The ADM-42 comes standard with two 1,920-character pages of memory optionally expandable to eight pages in two-page increments. All pages have independent protection similar to that of the ADM-31, the firm indicated.

The ADM-42 features a detachable keyboard with upper and lower case alphas, numerics, punctuation, control, numeric keypad and 16 function keys as standard. The function keys are shiftable to initiate 32 specific functions external to the terminal; programmable function keys are available as an option.

Three Ways to Tab

The ADM-42 also gives the operator three ways to tab: a protection mode that tabs to the first unprotected space; a modulo tab to be set at any number from one to 79; and a columnar tab equivalent to that on a standard typewriter.

The terminal features a high resolution, 15-in. diagonal CRT screen depicting data in 24 lines of 80 characters using a 7 by 9 dot matrix. A 25th line is provided for terminal status indicators and messages of up to 79 characters, the firm added.

Upwardly compatible with the earlier Model ADM-2 and reportedly preprogrammed for compatibility with standard CPUs, the ADM-42 costs \$1,795.

Lear Siegler's Data Products Division is at 714 N. Brookhurst, Anaheim, Calif. 92803.

*Fast, efficient
and economical;
the new printer and
printing terminal from
Hewlett-Packard.*

HEWLETT  PACKARD

**RENT IT TODAY—
USE IT TOMORROW!**

"BRAND NEW"

DECWRITER II & III

LA36 — LS120

★ MONTH-TO-MONTH LEASE
3 MONTH MINIMUM

★ ALL OPTIONS

★ DEC MAINTENANCE
UPON REQUEST

★ IMMEDIATE DELIVERY

AMERICAN TERMINAL LEASING
617-261-1100

P.O. BOX 68 KENMORE STA., BOSTON, MASS. 02215

Unit Gives 360, 370 Remote Batch Capability

SAN ANTONIO, Texas — The Datapoint Corp. Attached Support Processor (DASP) is said to allow IBM 360 and 370 and equivalent computers which lack teleprocessing features to engage in remote batch telecommunications.

The processor permits an application now executable on an IBM 360 or 370 to be submitted to it for processing by a Datapoint CPU via telephone

line from a distant location, a spokesman explained.

DASP requires no IBM teleprocessing hardware or software and imposes no telecommunications or disk retrieval overhead on the IBM system to which it attaches, the firm said. Most jobs reportedly execute faster using DASP than when submitted to an IBM system through its own input devices.

DASP, which appears to the

IBM system as an IBM card reader, card punch, card reader/punch, line printer and alternate system console, can handle thousands of records per minute compared with standard card readers, which typically process no more than 500 records per minute, Datapoint claimed.

Four Phone Lines

Comprised of both hardware and software components,

DASP performs batch teleprocessing functions by simultaneously controlling up to four telephone lines from remote locations. Operating at speeds of up to 9,600 bit/sec, the processor receives and spools incoming job requests onto its own cartridge disk storage.

This data is then submitted by DASP through the byte multiplexer channel of the IBM mainframe for process-

ing.

Since the four telephone lines managed by DASP can be any combination of multipoint, leased point-to-point or direct dial facilities, any number of remote sites can be accommodated.

Remote jobs may be submitted or completed jobs retrieved through DASP when the IBM system is engaged in other work or even when it is completely off-line, he claimed. To remote users, an IBM system equipped with DASP appears to be in operation and ready to receive work at all times.

DASP systems are available with various disk storage capabilities, ranging up to 160M bytes. A DASP consisting of a Datapoint Advanced Business Processor, 5M bytes of cartridge disk storage, a channel adapter and all DASP software can be purchased for \$37,500.

The same system leases for \$1,044/mo on a three-year basis from Datapoint at 9725 Datapoint Drive, San Antonio, Texas 78284.

TI'S BUBBLE MEMORY TERMINALS

One goes to market, one stays home.

Bubble memory to go—that's what Texas Instruments gives you in the Silent 700* Model 765, the portable memory terminal you can take with you.

And at only 17 pounds, this sleek, trim terminal is a welcome traveling companion. It fits easily beneath an airline seat, and sets up quickly in a customer's office. There, it lets you record sales data rapidly and quietly, without fussing with cassettes, diskettes or paper tapes.

Whether it consists of the orders recorded during the day, or real estate listings, insurance information, newspaper stories, or other data entry applications, you can wait until telephone rates are lower at night to transmit your information. You simply dial up the host computer, and the 765 will thermal-print a hard copy at 30 characters-per-second, giving you the option to edit or add on the spot.

Meanwhile, back at the home office is the 763, a tabletop model.



It comes standard with either a TTY-current loop or EIA interface, permitting transmission at rates up to 9600 baud. It prints quickly and quietly, edits cleanly, and has a powerful command mode with a full set



of key functions. In short, the 763 has everything the 765 has, less the portable features. Both models save time and money, and let your customers know you mean business.

Behind our bubble memory terminals is over 30 years of experience in the electronics industry and the technical expertise and support of our worldwide organization of factory-trained sales and service engineers, backed by TI-CARE†,

our nationwide automated service dispatching and field service management information system.

TI's two bubble memory terminals—one makes sales calls, the other minds the store. Meet both, simply by calling your nearest TI sales office. Or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001, or phone (713) 491-5115, ext. 2124.

Yes! I am interested in the Silent 700 Bubble Memory Terminals.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____

State _____

Zip _____

Mail to: _____

TEXAS INSTRUMENTS

INCORPORATED

P.O. Box 1444, M/S 784, Houston, Texas 77001

22-7-CW

*Trademark of Texas Instruments †Service Mark of Texas Instruments
 Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

We put computing within everyone's reach.

I/O System Uses Cards

HORSHAM, Pa. — A punched card I/O subsystem for communications terminals, CPUs and data entry systems has been introduced by Decision Data Computer Corp.

The CS 780-4 is said to print from 80- or 96-column cards at speeds up to 900 line/min, functioning as an I/O unit, remote batch or remote job entry terminal for a variety of systems.

Software modifications, extra modems or telephone lines are not required for a direct interface with a CPU, the firm added.

The subsystem connects directly to a controlling processor through its communications port, using binary synchronous protocol and IBM 2780 emulation.

The CS 780-4 ranges in price from \$10,650 to \$10,950; it can be rented for \$292 to \$410/mo including maintenance, depending on the model and contract terms.

Decision Data is at 100 Witmer Road, Horsham, Pa. 19044.

165-II

With a DAT this is almost a 168! Machines available now. With tie-in leases to your 3033

COMDISCO
 312-698-3000

Series 360 at 10% of List

Third-Party IBM Gear Now Low Priced

By Howard A. Karten
CW Staff

TROY, Mich. — The third-party market for IBM systems and peripherals is continuing to grow at a rapid pace, offering users greatly reduced prices according to CMI Corp. here, a broker for third-party systems and peripherals.

Prices for IBM 370 CPUs vary from 35% to 80% of IBM list price, CMI noted. The supply of 370/138s and 148s is limited,

however, and those machines are selling at prices up to 80% of the original IBM list price.

The 370/135 and 155, although similarly in limited supply, are bargains, typically selling at only 35% to 40% of list, the broker said.

The demand for 3000 series tape and disk drives is brisk, with the tapes typically selling for 75% to 85% of IBM list and the disk drives going for 55% to 60% of the mainframer's original

asking price.

In comparison, the 2000 series tapes and disks are a bargain, CMI said, typically pulling in only 20% of IBM's list prices.

The older 360 series CPUs now typically sell for only 10% of list price, the broker said, with the 360/20 still in demand as a small, stand-alone unit. Contrasting with this, customers are paying a premium for IBM's latest processors, the 30 series, with very few systems available for lease in

1979.

The demand for communications equipment also continues to be strong, with Model 3270 terminals typically commanding 80% of list and the controllers for the CRTs typically going for more than 100% of list.

Although the supply of this equipment is ample, IBM's later 3278 equipment is limited and also commanding a premium over IBM list price. However, 1978 delivery from CMI on this equipment is available.

Third-party prices for System/3 equipment vary considerably, ranging from 30% to 50% of list for a Model 10 and 60% to 75% of list for a Model 12 — in ample supply — to 85% of list for a Model 15. The latter is in limited supply, the broker observed, calling it the best price/performance model in the line.

I/O gear for the System/3 is in limited supply, CMI noted, typically bringing 70% of list.

Little activity has been observed by CMI in the market for Model 8s, an ample supply there resulting in typical discounts of 50% off list prices.

The System/34 is commanding a premium, with positions available despite the high price.

Demand for 1130

In other areas, CMI said, demand remains strong for the older IBM 1130, although there is an ample supply of these systems and they are typically bringing in only 25% of IBM list.

The supply of keypunches is also ample, although these are going up for up to 60% of IBM list.

The broker sees a strong demand for both 2000 series card equipment and 1400 series card equipment. CMI attributed the limited supply in both areas to the premium prices users are currently paying for them.

Demand also continues strong for the 3000 series printers, in limited supply and typically bringing in 70% of list price.

Tape and disk drives in the 2000 series are bargains, CMI reported, generally going for 20% of list despite a limited supply of the disks. However, the tapes are said to be in ample supply.

Consultant Predicts

MIS Still a Few Years Away

By a CW Staff Writer

NEW YORK — Management information systems (MIS), initially touted in the 1960s but not yet achieved, will ultimately enable management to retrieve any information it wants — but not until the 1980s, according to William A. O'Brien.

The consultant on information systems and data processing with Emory Ayers Associates here recently predicted management will at last see its dream of effective, responsive information systems realized by the mid-1980s. "The stature of DP professionals will improve dramatically in their companies" when this comes about, O'Brien said.

Unlike many futurists, O'Brien sees a continuing role for large, centralized computers within organizations. While predicting that "larger computers and minicomputers will become simpler in design, more economical to use and easier for users to cost-justify," he foresaw "the continuing need for the large computer and corporate [data] center for the company's main processing needs, such as processing checks, writing premium notices or imprinting utility bills."

"In addition," he said, "operating systems will be simpler and thus less wasteful of computer power."

'Pseudo' On-Line Processing

Adding that terminal equipment, particularly for decentralized data collection, will come into wider play, the consultant said he anticipates decentralization of data collection will cause systems designers to "venture away from batch processing toward 'pseudo' on-line processing, in which input will be processed interactively with the computer and file inquiry will be performed on files updated in a batch environment."

Accompanying these changes in hardware will be a change in the relation between the DP department and end-user departments. Users within a company will become more involved in DP activities, O'Brien said, which means they will have to accept both greater responsibility and

greater risk.

However, it also means members of management will become less concerned about DP because it will become less visible to them and will be better justified, O'Brien noted.

While "equipment and systems development costs will continue their downward trend," people costs will continue to rise, O'Brien predicted. In addition, he sees DP management practices and procedures worsening as users take over more of their DP functions and begin to operate their own computers.

Despite this, senior management will be more satisfied with the DP environment, since it will see a better return on investment.

Role of DPs

In making his predictions, O'Brien indicated DP personnel will continue to play an important role in their organizations. Acting both as technical advisors to users and integrators of infor-

mation systems, analysts and programmers will help define the needs of corporate users.

However, DP organizations "will have to respond better to users' needs," O'Brien contended. He sees greater competition developing both outside the company, in the form of service organizations, and within the company, in the form of end-user departments with minicomputers that wish to serve other users.

Success for "the more exotic, industry-controlled systems, such as those employing distributed processing techniques and electronic mail," was another of O'Brien's auguries. He attributed this success to the fact that they are fully under the control of the organizations that promote these services.

In contrast, consumer-controlled systems such as electronic funds transfer systems, are not fully controllable; therefore, he sees a more modest success for them.

Caere OCR System Offers User Guidelights

MOUNTAIN VIEW, Calif. — An optical character recognition (OCR) system featuring dual "guidelights" to assist the user has been introduced by Caere Corp.

The Series 700 is available in several different configurations — as a complete system with a microprocessor, housing and base, for example, or as a subsystem without power supply, mounting brackets, cover or base.

The system is also available with several interfaces, including parallel, single-port serial and dual-port serial, according to a spokesman.

The Series 700 recognizes and transmits data on coded alpha and numeric documents printed in the National Retail Merchants Association (NRMA) OCR-A Size 1 type font. It features an automatic line-tracking feature to provide consistent long-line

reading on first-pass scans, the spokesman noted.

Prices for the system range from \$2,000 to \$2,500, depending on options selected, from Caere at 345 E. Middlefield Road, Mountain View, Calif. 94043.

Any Ideas Out There?

Money is tight and getting tighter, and sometimes it doesn't look like the DP dollar will stretch any more than it already has. But many DP managers are finding ways to make their budgets go just a little bit further.

Computerworld would like to hear about those money-saving methods so it can pass them on to other users in a September Special Report on Stretching the DP Dollar. The report will cover ideas that range from saving costs on supplies and salaries to optimizing equipment use.

Readers are invited to contribute articles detailing their ideas, their experiences, their successes — and their failures — in holding down DP costs. Contributions should be typed, double-spaced, about four or five pages long and sent by Aug. 4 to Ann Dooley at CW, 797 Washington St., Newton, Mass. 02160.

User Enthusiasm Only 'Problem'

CPUs Give San Diego Shipbuilder Clear Sailing

By Howard A. Karten
CW Staff

SAN DIEGO — A ship builder here is using IBM 370/145 and 370/148 mainframes to assist in all phases of the design and production of the largest ships ever built on the West Coast, four 188,500-deadweight-ton oil tankers.

Not only are the systems saving time and money but — in contrast to the typical situation where there is employee resistance — the shipyard workers are hungry for more computer assistance, the company reported.

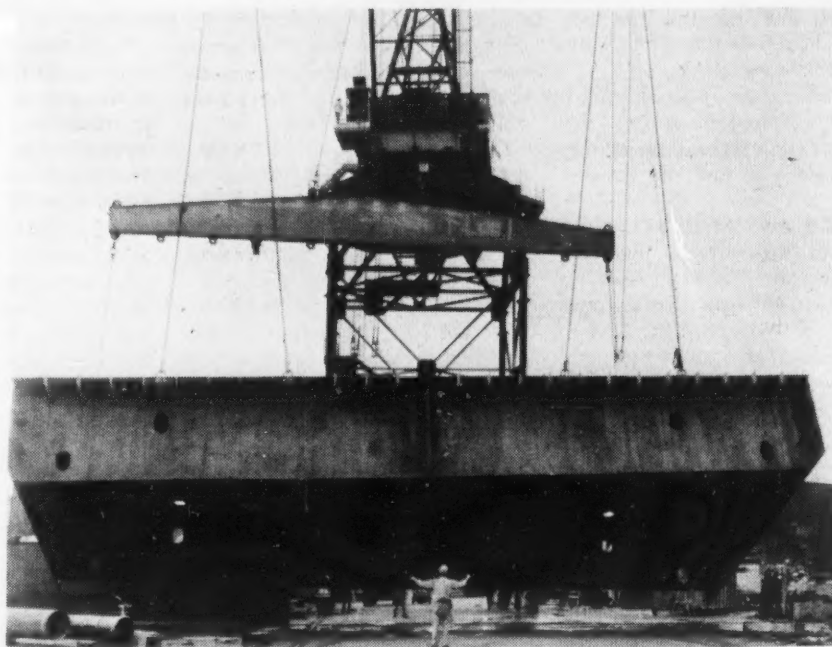
The National Steel and Shipbuilding Co. (Nassco) has four principal uses for its systems in producing the vessels:

- To economize on the use of the steel plate that makes up the vessels.
- To assist in the design of the ships.
- To keep track of the inventory of parts already produced.

• To make the paper tapes that control the actual cutting of parts from stock steel sheets.

All this is being accomplished with the 370/145 and 370/148, each with 1M byte of core memory. Nassco runs under DOS/VS, using Power/VS for spooling on the 148 and VM on the 145.

The operating system on the 145 runs both DOS/VS and OS/VS, according to Tom Furtak, manager of operations, and an IBM 3705 is attached



A camera angle makes a Nassco shipyard foreman, who was directing movement of a ship subassembly, look as if he was lifting the part. Such giant assemblies are designed using an IBM 370/145 and 148 programmed to make the assemblies fit together despite their bulk — they range up to 35 feet long and may weigh up to 150 tons.

to the 148 to control a network of 120 Model 3270 CRTs.

The systems operate seven days a week, according to Tom Browning, manager of systems analysis and programming for the shipbuilder, but are actually used in conjunction with the

shipbuilding operation approximately five and a half days each week. It is not unusual for this use to cover 18.5 hours per day, he added.

Software development and debugging take up the remaining one and a half days each week, along with an effort currently under way to convert the company's operation from DOS to OS.

The construction of large vessels at Nassco begins with the layout of the hulls. After a naval architect produces the initial specifications for a large vessel, these specifications are input to a software system called the Ships Production and Design System (Spades). Spades performs a process called fairing, which is "a fine-tuning process that attempts to reduce the irregularities in the hull which produce drag — the friction of the hull against the water."

Twenty years ago, prior to the widespread use of computers, fairing had to be done full-scale, in a large area called a mold loft. The use of computers in the process has several advantages: it is less time-consuming, less space-consuming and more accurate.

In addition, the computer is used

merely as an advisory tool; experienced craftsman can — and often do — override the system.

The computer is a valuable tool for Nassco, according to Furtak, and is available about 95% of the time it is needed. To minimize the effect of the system going down, all peripherals are shared between the two systems.

However, if the network does go down, "the workers in the yard have nothing to do and, as a result, are really impacted," Furtak said. The weakest link in the system is the Pacific Bell Telephone Co. modems, he added.

Drafting and Burning

Another key use of the system is in producing the actual steel shapes which are welded together to form the ship. Shipyard employees called loftsmen, working from the architectural blueprints, use the IBM 3270 terminals to define the shape of the steel parts.

Spades then uses this information to produce paper tapes used off-line in drafting and burning machines. The drafting machine, a Kongsberg plotter, draws the requested part full-scale for visual checking. If the result is satisfactory, the tape is saved for the later control of devices called plasma burners. It is these plasma burners — torches capable of cutting 7.5 feet of half-inch-thick steel per minute — which produce the plates.

Although the prime use of Spades is in efficient use of manpower, since labor costs more than materials, Nassco also takes advantage of the system to minimize steel waste. All aspects of computer usage are tied in to a data base, and part of this is devoted to keeping an inventory of parts ready for generation.

The process, called nesting, keeps track of pattern tapes within a specific time period. This feature enables the shipbuilder to cut the parts from a stock steel plate when they are needed, which minimizes both the time spent looking for parts prepared in advance and waste from a single plate.

Although Nassco is very pleased with the way its system is working, Furtak did report he has one problem: "There's a clamoring for more and more information. One of my problems is finding more good analysts and programmers to support the users, who are so enthusiastic."

"The" AccessControl System

!! UDID CARD 0043 AT DOOR 03 !!

MICROSCAN

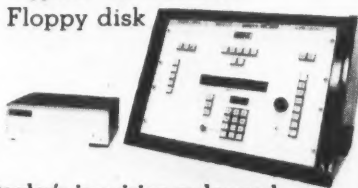
Why Do The Government, Major Utilities and Industry Use MICROSCAN, Our Latest Proprietary Access Control And Alarm System?

Here's Why...

- 1 — Microprocessor based access control, alarm system
- 2 — Operator oriented Alpha-Numeric display talks English
- 3 — Simple programming procedures
- 4 — Panel lock prevents unauthorized programming
- 5 — Multiple security status levels
- 6 — Eight weekly time zones
- 7 — Maximum 1.5 second response time

Optional Equipment

- Eighty column English language printer
- Map display panel location
- Cypher card reader
- Floppy disk



Dealer's inquiries welcomed

For more information please contact:

VIKONICS, INC.
23-25 East 26th Street,
New York, N.Y. 10010 (212) 686-4152

Microprogram Formatter Built for Wangco Drives

LOS ANGELES — The Wangco Division of Perkin-Elmer Corp. has introduced a microprogrammed embedded formatter for Wangco Model 8, 10, 11 and 12 tape drives.

The formatter, powered by a 5 Vdc supply in the master tape transport, is totally plug-to-plug-compatible with the company's stand-alone formatter product line, company officials said.

Contained on a single 11- by 17-in. multilayered printed circuit board, the device has jumper-selectable, industry-standard interfaces to the host computer, the spokesmen added, and can run NRZI, phase-encoded (PE) or

dual-density tape drives.

The formatter is totally IBM- and Ansi-compatible, Wangco claimed. Switch-selectable operating speeds range from 1.25- to 75 in./sec.

Up to three additional drives can be daisy-chained off one embedded formatter, a spokesman noted.

In OEM quantities of 100, the formatter costs \$1,237 for the NRZI model, \$1,478 for the PE version and \$1,500 for the dual-density model. First deliveries are scheduled within two months, the officials said from 5404 Jandy Place, Los Angeles, Calif. 90066.

Printer Produces Variety of Graphics Images

DERRY, N.H. — Graphics images such as signatures, logos and sketches as well as a wide variety of print fonts, sizes and character, including ideographic languages such as Japanese or

Chinese, can be produced using a printer recently introduced by R.C. Sanders Technology Systems, Inc.

The Media 12/7 printer uses a large number of tiny ink dots to construct

images, company officials said, with "virtually no limit to the shape or size of the characters or images that can be produced" on the machine.

The imaging method, which the company calls an "infinite matrix principle," is said to control horizontal dot placement to .001 in. and vertical dot positioning to .0035 in. The seven-wire, impact dot matrix print head is driven by a microprocessor-based control system, according to a spokesman.

Print speed of the unit is a function of type size, desired quality and speed of the print head, the spokesman added, and can be calculated for each individual type font. For example, a 12-pitch, typewriter-quality typeface will print at approximately 36 char./sec, while a pitch of 18 prints at 216

char./sec, the unit's maximum speed.

Additional features of the printer include a pressure friction roller for paper feed, RS-232C-compatible interfaces, 128-character Ascii input and replaceable print head. A pin-feed is also available as an option and the system can print on four-ply paper, the spokesman said.

Fourteen read-only memory chips holding up to eight type faces come with the machine, and logos and signatures can be programmed into the chips by the company, he explained.

Standard parallel and serial (RS-232C) interfaces are available on the printer, which sells for \$4,000 in units of one, or \$1,350 in OEM quantities, from the company at 5 Tinkham Ave., P.O. Box 324, Derry, N.H. 03038.

Free Literature Offered

Several companies have announced literature or booklets of interest to qualified parties in DP:

- CTS Knights, Inc., 400 Reimann Ave., Sandwich, Ill. 60548, is offering a 20-page catalog on the company's product line of microprocessor crystals, crystal clock and hybrid oscillators and more than 100 different standard filters. The catalog also contains performance data as well as electrical, mechanical and environmental specifications required to specify the company's frequency control devices. Also described in the catalog are the company's crystal discriminators, ovens, temperature-compensated crystals and other products.

- A bulletin describing the models R601 and R602 computing subsystems manufactured by Intronics, Inc. provides specifications and characteristics for the devices as well as applications data, block diagrams, dimensions and pinout specifications. The devices are modular units used to compute the true-RMS value of waveforms varying in frequency from DC to 1 MHz. The company is located at 57 Chapel St., Newton, Mass. 02158.

- A data sheet covering the TDC-1007J video analog-to-digital integrated circuit manufactured by TRW, Inc. is available from that company. The 12-page brochure contains detailed information on using the recently introduced device, which is a 30 MHz, 8-bit device that dissipates 2W. Additional information concerns output coding, a circuit for an evaluation board and etching diagrams as well as other specifications and general notes. TRW can be reached through P.O. Box 1125, Redondo Beach, Calif. 92078.

- "Installation and Maintenance of High-Resolution Optical Shaft Encoders" is the title of a report being offered by the Measurement Systems Division of Itek Corp., 27 Christina



'Don't Worry. Acronym-Phobia Is Common Among Programmers.'

STANDARDS

Installing or upgrading Standards for your D.P. organization??

Write for FREE complete index of required documentation Standards. D.P. Directors and Manager write on your organization letterhead to:

Management Dimensions
1754 E. Morada Place
Altadena, CA 91001

St., Newton, Mass. 02161. Written by Donald H. Breslow, director of engineering for the company, the booklet cites techniques for lowering operating costs and improving reliability.

- Advice on the care and feeding of disk packs and a nontechnical discussion of the workings of disk packs and drives are included in an eight-page brochure from Nashua Corp. of Nashua, N.H. 03060.

ATTN: DOS USERS...

OS USERS sans TSO...

HEARD ABOUT BRAEGEN'S TSO?

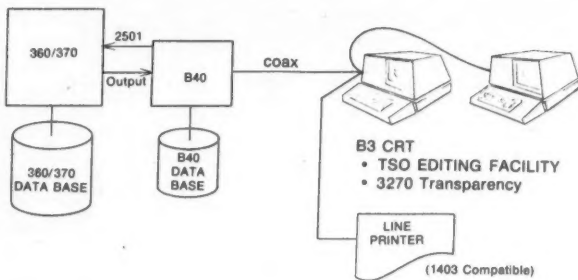
Our offline TSO Editor is available now!

It works with 360 or 370 DOS or OS.

How is this possible?

The Braegen B40 Intelligent Controller attaches directly to your 360/370 channel. No reprogramming is required and no 3270 support software is required. The interface for transferring files between your 360/370 and the B40 is standard 2501 card reader compatible. Your programmers use Braegen's B3 CRT/Keyboard terminals and a full-function interactive editor to update programs on the B40 Disk Data Base.

And the B40 does this independently, so your 360/370 is more available. Batch jobs are submitted from CRT's for compile or execution. Meanwhile, other jobs can also be submitted from your other card reader.



Really?

Yes.

The result is you get the benefits of TSO without 360/370 overhead. And the same B40 can also include 2501-compatible card readers, and 1403-compatible line printers, to ease your unit-record load. Locate these (and the terminals) in the programmers' area, up to 7500' from the computer center via coax cable.



There's More?

Yes.

The B40 works with existing library or data files. Programs, data, and JCL decks can be easily transferred between the B40 Disk Data Base and your 360/370 files.

If you have 3270 support now, the same B40 can concurrently run as a 3272, along with our unique features such as Address Switching, Multiple Interfaces, Multiple drops/coax, and 7500' coax length.

Get On-Line Now

DOS users can do all this using any model from 360/25 through 370/168. DOS/360 or DOS/VS. You don't need a 370x, a megabyte of memory, or any software changes! Works great with POWER or other spooling packages.

OS users also get benefits. Since your 360/370 isn't swamped with TSO overhead you get immediate CRT response time.

We Lease, Sell and Service. Braegen's products are supported 24 hours a day, 7 days a week, in all major metropolitan areas.

The Braegen Corporation, 20740 Valley Green Drive, Cupertino, California, 95014. Telephone (408) 255-4200.



BRAEGEN

Multitask Typography System Has 64K Core

TETERBORO, N.J. — Core memory, a 120,000-word dictionary, CRTs, disk drives and multiple convenience features highlight a computer-based typography system introduced here by Compuscan, Inc.

Comap is a modular, interactive, multitask system for use in the word-processing industry. A 64K core memory, one or two 10M-byte disk drives and a 120 line/min printer are

said to provide users with unlimited kerning combinations (variable and proportional spacing between letters), simultaneous output to typesetters, editing and file management capabilities.

Other hardware features on the machine include the ability to attach up to four CRTs, paper tape reader and punch, a Texas Instruments, Inc. TI 700 mini-console and an on-line phototypesetter.

Users can perform simultaneous input, editing and output functions, input from multiple sources such as optical scanner and tape perforating keyboards and scroll in forward, reverse and horizontal modes, a spokesman explained. Page breaking and a 120,000-word dictionary for hyphenation, expandable to include user-defined words, are also included, the spokesman added.

A basic system including two CRTs, CPU, full software and line printer, sells for \$79,000, the company said.

Also interfaceable with the Comap system is the company's newly introduced Alphaword optical page scanner. The Alphaword can scan rough-draft text at more than 200 page/hour, the company said, with an undetected error rate of less than one character for every 100,000 scanned.

A standard RS-232C interface and optional features, such as dual font capability, a code conversion feature (to input commonly used text using abbreviated symbols) and deletion symbol editing are available with the system.

Other features include a vacuum-feed mechanism and an LED display and keyboard to aid the operator in making changes, a spokesman added.

Prices for the Alphaword range from \$24,000 to \$26,000, depending on options, the company said from 900 Huyler St., Teterboro, N.J. 07608.

Microcomputer System Solution. Announcing the IMSAI VDP-40.



- Fully integrated video data processor in a single cabinet.
- Twin floppies, professional keyboard, S-100 expansion slots.
- 24 line by 80 char. CRT, insert/delete, programmable font, protected fields, inverse video.
- Handsome flip-top cabinet for easy access.
- Serial and parallel I/O ports included.
- FORTRAN IV, Extended and Commercial BASIC.
- IMDOS.
- ISAM.

You've decided you want a microcomputer DP center — but what to buy? A component system? A computer box here, a CRT box there, a keyboard box, a floppy disk box ... A so called inexpensive \$695 system? No disk; no way to add enough memory ... and if you could, it's not inexpensive anymore; and you still wind up with a collection of boxes.

The IMSAI VDP-40 is a fully integrated Video Data Processing system and comes equipped with your choice of 32K or 64K RAM on our own advanced RAM III board. In one cabinet, the VDP-40 combines a professional keyboard, heavy-duty power

supply, twin mini-floppies, a multi-slotted motherboard, 9-inch CRT, plus RAM at a new price/performance never before achieved.

System Expansion? Extra slots in our S-100 bus motherboard and our new power supply allow almost unlimited expansion.

Need more disk expansion? A controller option of the VDP-40 allows expansion to greater than 4.5M Bytes.

Add a line printer, an IBM compatible tape drive, a modem; all are available, with the interfaces and software to make it work for you.

IMSAI's VDP-40 price/performance means every home or business can now afford a complete DP center. Check us out. IMSAI has what you want and what you need. Visit your dealer or write us directly. Features subject to change without notice.

IMSAI®

The Standard of Excellence
In Microcomputer Systems

IMSAI Manufacturing Corporation,
Dept. EWN, 14860 Wicks Boulevard
San Leandro, CA 94577
(415) 483-2093 TWX 910-366-7287

IMSAI EUROPE
Europa Terrassen
8 Rue Jean Engling
Dommeldange, Luxembourg
43-67-46 Telex: 1428

Price/Performance no one else has put together.

Units Supply High Voltage

HIGH BRIDGE, N.J. — A series of solid-state, high-voltage power supplies featuring oscillator-rectifier circuitry has been unveiled by Glassman High Voltage, Inc.

The LG series is available with nine output ranges from 5 kV/20 mA to 100 kV/1 mA with either fixed or reversible polarity, company officials said. The ferrite core transformer power oscillator design is said to minimize power loss and to provide inherent protection against failure to restart after overload, damage from overload or shorts and transient spike. The design also provides protection against loss of reliability because of stress at high output after over-voltage in remote programming mode.

Regulation to within .005% on both line and load is provided, the officials noted, and the system takes less than 5 msec to recover from a 50% load transient. Ripple reaches a .1% maximum only at full load, and full load efficiency is said to be better than 75%.

Prices range from \$705 at the low end of the product line to \$2,650 at the top for single-unit quantities, with discounts of as much as 10% for quantities of five to nine, the company said from High Bridge, N.J. 08829.

OMSI PASCAL-1

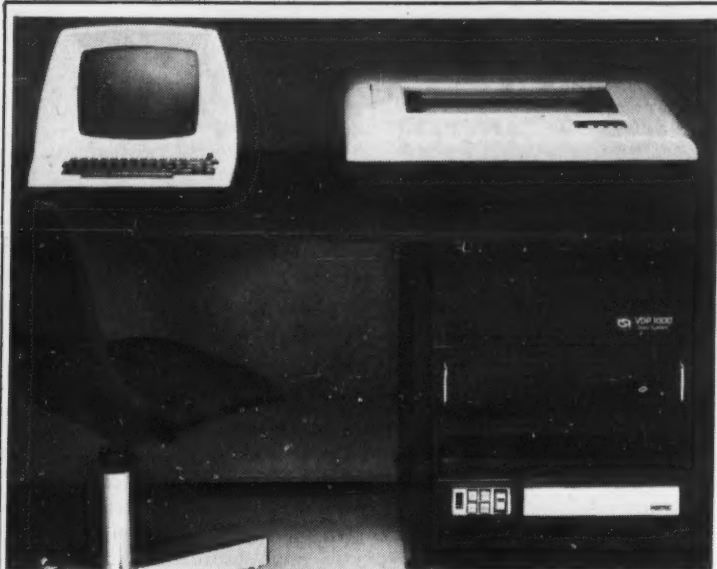
for LSI-11 through PDP-11/70 \$1500



Call (503) 226-7760 for a free demonstration

Oregon
Software Inc.

2340 SW Canyon Road
Portland, Oregon 97201



Lear Siegler VDP-1000

Virtual System Runs Expanded Programs

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Users can run programs "at least 25% larger" than main memory with a 64K-byte small business system from Lear Siegler, Inc., according to a spokeswoman for the company.

The VDP-1000 provides an "extensive" instruction set that reportedly allows both the product's Virtual Memory Operating System (Vmos) and applications programs to be disk-resident.

Thus, unlike many other small business systems that require all their software to be resident in main memory, the VDP-1000 can summon segments of Vmos and applications programs as needed from disk, the spokeswoman explained. The result is an increase in the memory space available for user programs, she added.

With the introduction of its first virtual memory system, Lear Siegler has enlarged its VDP family of data systems to two mem-

(Continued on Page 30)

By Boosting Public Income System Helps County Avert Tax Hikes

GULFPORT, Miss. — No tax-slashing ballot initiatives like California's controversial Proposition 13 appear headed for Harrison County, and government administrators here can credit their good fortune in part to their recently installed small business system.

Although officials here at the seat of this rural Gulf Coast county originally acquired the system to oversee their spending and perform standard accounting functions, they soon found they could also use the equipment to supplement the area's public treasury, according to Chancery Clerk G.N. (Nicky) Creel.

With the extra income — expected to total \$1.25 million during the next two years — administrators can minimize property taxes and avert new assessments, a rare achievement at a time when many other parts of the country rumble with growing taxpayer unrest.

\$50,000 Monthly Dividend

How do administrators here intend to keep local taxes under control? They simply deposit all county funds that won't be expended for at least 30 days in short-term bank accounts and

program the minicomputer to keep track of each investment.

When needed for spending, the funds are withdrawn from the bank, and county officials collect the interest that has accrued. In this way, they can parlay the area's \$18 million annual budget into a monthly dividend of nearly \$50,000.

Thus, the \$41,000 small business system "pays for itself every time we get a [monthly] investment statement from the bank," Creel reported.

Without a computer to track the county's score of simultaneous accounts, government officials could never have used investments to supplement the area's public income, Comptroller T.J. Eure asserted.

To succeed, a money-making venture like Harrison County's demands "immediate control over every single account," Eure said. "Before we put in the system, we had 136 individual funds requiring individual reconciliation. We had six employees who had all they could do to get out monthly payments. There was no way we could have tracked investments."

Ironically, however, filling the public coffers was probably the

last thing on local administrators' minds when the county government first acquired its current financial management system.

Creel traced the installation to a fire that destroyed the Harrison County Courthouse and many of the valuable public records stored inside. With no place to work and a government payroll less than a week away, Creel realized he would have to restore his department's operations in record time.

Working with employees and a Wang Laboratories, Inc. mini-

computer at the Southern Mississippi Planning and Development District (SMPDD), he frantically developed enough software to automate the county's payroll and, within five days of the fire, had paid his staff on time.

The payroll incident convinced Creel that a minicomputer similar to the SMPDD's could simplify many of the time-consuming accounting tasks the county had previously done manually. He arranged to install

(Continued on Page 31)

User Group's Services To Ease CPU Selection

By Jeffry Beeler
CW Staff

BOULDER, Colo. — You are a user or prospective user with a problem. You want to acquire a small system, but you're overwhelmed by the number of options and can't decide which machine to choose. Where do you turn for help?

One potential source of advice is the Association of Small Computer Users (Ascu), a newly formed group that aims to help mini and micro users sift through the potpourri of available small systems and select the configurations best suited to their individual computing needs.

To achieve this goal, Ascu will offer its members various services, the most valuable of which will probably be its comparative benchmark reports, according to the group's founder and president, Hillel Segal.

Under the benchmarking program, Ascu will hire an outside consulting firm to rate similar systems on cost and performance. The consultant's findings will then be made available to Ascu members through one of the association's internal publications.

"We looked around a lot before we formed the group, but we couldn't find any information

source that offered exactly the kind of service we will provide," Segal recalled. "Many companies like Datapro and Auerbach provide very good information about the features of competing equipment models, but to my knowledge none of these kinds of organizations even try to supply comparative benchmarks."

Package of Publications

Among its other services, Ascu will provide members with a package of DP-oriented publications including the association's bimonthly "Interactive Computing" newsletter, at least one trade newspaper, two Datapro Research Corp. feature reports about minis and small business systems and discounted editions of the *ICP Mini-Small Business Systems Software Directory*.

The association will also sponsor an information exchange service aimed at stimulating DP-related communication among group members. Under Segal's direction, the service will refer users with inquiries about a specific equipment model to other users who have first-hand experience with the hardware in question.

Unlike the users' information exchange and the publications

(Continued on Page 32)

Get It Off Your Chest

Many users and industry officials have worthwhile things to say to their colleagues, but are seldom heard because they lack an appropriate forum.

If you're one of those individuals, here's your chance to get those important opinions off your chest and out into the world where they can do some good. *Computerworld* is now seeking reader contributions to its August Special Report on Minicomputers and Small Business Systems.

Maybe you're a user who found an ingenious small systems solution to a crucial business problem or who has an unusual installation experience to relate. Or perhaps you're a company official with industry tips or prognostications about which users should know.

If you have something interesting to say on the subject of minis or small business systems, CW wants to hear from you — and so do nearly 90,000 CW readers.

Contributions should be four to eight double-spaced, typewritten pages long and should be submitted no later than July 20 to Jeffry Beeler, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

MINI WORLD

Comb Matrix Printer Configured Two Ways

KENT, Wash. — Users can reportedly configure a 300 line/min printer from Tally Corp. as a desktop unit or a stand-up unit with its electronics either in a pedestal or integrated into the unit's architecture.

The Model T-3300 prints 7 by 7 dot matrix characters across a 132-column line with 6- or 8 line/in., a Tally official said. The comb matrix printer also provides forms thickness control, line feed, form feed, continuous feed and paper-out alarm capabilities.

Operator Features

Operator features available with the impact printer include a reel-to-reel ribbon system and a paper positioning feature that lets users advance or retard print positions .016 in. at a time, the spokesmen said.

The T-3300 incorporates two

single-board microprocessors — one to control all printing functions and the other to control I/O, status and diagnostic functions.

An integral LED status panel indicates faults and tells whether the conditions are operator-correctable or require a serviceman. A standard self-test feature, meanwhile, allows users to run up to six print routines as well as check the printer's CPUs, indicators, switches and motors, the spokesmen noted.

Assorted off-the-shelf controllers make the unit plug-compatible with most popular minicomputers, data communications systems and other printers, Tally claimed. The product also comes with a choice of RS-232 serial interfaces.

Prices for the T-3300 start at \$6,100 with quantity discounts available from Tally at 8301 S. 180th St., Kent, Wash. 98031.

Lear Siegler Virtual Unit Handles Larger Programs

(Continued from Page 29)

bers. The first member of that series — an intelligent terminal dubbed the VDP-400 — appeared about a year ago and is programmed almost entirely in firmware.

Users can program forms and certain attribute fields with the VDP-400, but otherwise the system is not user-programmable, nor can it accommodate any language compilers.

The VDP-1000, by contrast, provides a choice of three compilers — for Basic and Cobol, which "most business systems users probably already know," and for Asgol, a hybrid of Algol and the Data General Corp. Nova assembly language, the spokeswoman said.

Elaborating on the differences between the two VDP systems, the spokeswoman said the 400 uses Nova-compatible main memory, compared with dynamic random-access memory (RAM) for the 1000. The two systems also use different operating systems, although they incorporate the same CPU, which cycles in 200 nsec with an average 600 nsec memory fetch, she noted.

Greater Power

Although the VDP-1000 belongs in the same hardware class as the Nova 1200 and comparable systems, it provides "somewhat greater" computing power than its DG counterpart, the spokeswoman claimed. Just how much of a performance edge the Lear Siegler machine provides over rival equipment, however, will remain uncertain until the company can finish benchmarking its system, she added.

Lear Siegler cited cost as the VDP-1000's main advantage over competing systems. While a floppy disk-based version of DG's Eclipse CS/20 costs about \$11,000, a similarly configured VDP-1000 sells for less than \$8,000, the spokeswoman reported.

An Eclipse CS/60 based on rigid disk systems, meanwhile, lists for about

\$40,000, compared with \$18,000 for a comparable Lear Siegler system.

Another area in which the VDP-1000 reportedly outperforms its competitors is in peripheral quality. "Many users complain that CPU vendors often don't supply very good peripherals," the spokeswoman said.

Lear Siegler, on the other hand, is known primarily as a peripherals supplier, "and now we have a minicomputer to go with those peripherals," the official noted. "People seem to like the idea of buying a complete system from one manufacturer."

Two Versions

Users can specify a VDP-1000 in one of two configurations: a hard disk version and a floppy disk version. A minimum hard disk-based configuration incorporates a 64K-byte CPU, 10M-byte cartridge disk system, ADM-3A dumb terminal, 180 char./sec Model 310 Ballistic printer, Vmos operating system and one of the three compilers.

A minimum floppy disk-based VDP-1000 configuration consists of the same hardware and software except that the disk system is replaced with a 1.25M-byte double-sided, double-density floppy disk unit.

To the minimum hard disk configuration, users can add up to three 10M-byte mass storage systems for a total capacity of 40M bytes. The minimum floppy disk-based version can also accept three additional memory units for a total mass storage capacity of 5M bytes.

Expandable Configuration

Under Vmos, the VDP-1000 can serve only as a single-station, stand-alone system. With Blis Cobol or some other Nova-compatible software tool, however, users can expand the system into a multiterminal configuration with communications capabilities, the spokeswoman said.

At present, 64K bytes represents the VDP-1000's maximum main memory, although Lear Siegler intends in the future to expand the system's capacity to 256K bytes, she added.

Among other enhancements planned for the system is the addition of a 300 line/min printer.

A minimum system with a floppy disk system costs \$7,995 compared with \$18,000 for a minimum hard disk-based configuration. Deliveries of both versions are scheduled to begin in September from Lear Siegler at 714 N. Brookhurst St., Anaheim, Calif. 92803.

HP Reduces Prices On Disk Memories

PALO ALTO, Calif. — Four versions of Hewlett-Packard Co.'s 7906 and 7920 disk memories have been reduced in price by \$500 to \$1,000, according to a spokesman.

The 20M-byte 7906 slave version — the 7906S — now costs \$10,000 compared with its former \$10,500 price, while the price of the rack-mounted 7906SR has fallen from \$9,500 to \$9,000.

The 50M-byte 7920 master version, the 7920M, has declined from \$17,500 to \$17,000, while the cost of the 7920S slave has dropped \$1,000 to \$13,000.

SERIES/1 ATTACHED TO IBM 360/370 SYSTEMS

Associated Computer Consultants, specialists in front-end processors and attachments to large computer networks, is offering the S1/370, a channel attachment connecting IBM Series/1 to the IBM 360 or 370 I/O channels. The device permits the Series/1, with appropriate software, to emulate standard IBM control units. It can connect to the 360/370 Byte Multiplexer, Block Multiplexer or Selector Channels. First deliveries of the S1/370 are scheduled for the fourth quarter of 1978. Contact ACC for further details.

ASSOCIATED COMPUTER CONSULTANTS

228 East Cota Street Santa Barbara California 93101
(805) 963-8801 TWX 910 334-4907

Versatility • Value • Service

TERMINALS
CRT's
PRINTERS
CPU's
TELETYPES®
COUPLERS
MODEMS



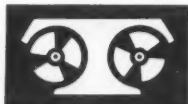
Terminal Systems Inc.

"Everything in

Mini-Computers

and Data-Communications."

Terminal Systems can stand the test of time!
Whether it be Service or just Friendly Advice
Terminal Systems can supply Your every Need



(213) 769-6772 (800) 423-2449 (415) 573-7723

TERMINAL SYSTEMS INC.

11300 HARTLAND STREET • NORTH HOLLYWOOD • CALIFORNIA 91605

For Novas, Eclipses Wangco Disk Controllers Emulate DG Subsystems

LOS ANGELES — Two disk system controller subsystems from Perkin-Elmer's Wangco Division emulate their counterparts for the Data General Corp. Nova and Eclipse minicomputer lines, according to a spokesman for the products' developers.

Compatible with DG's 4234 RDOS-5 controller, the Model WND-45 stores 20M byte/disk in a two-disk version — twice the capacity of the comparable DG unit, the official said. With a 1-bit software change, the system reportedly accepts two additional drives for a total capacity of 80M bytes, again twice the storage of the CPU manufacturer's four-drive equivalent.

The Model WND-25, meanwhile, is also compatible with the 4234 RDOS-5 and stores 10M byte/disk, but up to four of the units can be daisy-chained to one controller.

The Model WND-25 transfers 312kbyte/sec and stores 2,200 bit/in. at 200 track/in., while the Model WND-45 transfers 625k byte/sec and holds 4,400 bit/in. at 200 track/in.

Both units are said to accommodate either fixed or removable storage media and operate at 2,400 rev/min. The Model WND-25, however, uses both

Wangco SF or ST disk drives, while the larger unit uses only the ST 2422 disk drives.

Both models also store 256 16-bit word/sector and automatically perform sector/track header address verification, the official noted.

Housed on one 15-in. square circuit board, the controller subsystems reportedly occupy one CPU chassis slot and plug into backplanes without external adapters or special wiring.

In OEM quantities, the WND-25 and WND-45 cost \$5,118 and \$6,066, respectively, and are available from Wangco at 5404 Jandy Place, Los Angeles 90066.

Okidata Disk Series Gains Two More Members

MT. LAUREL, N.J. — Two additions to Okidata Corp.'s 3300 series disk systems store 13M and 80M bytes and occupy 7 in. of rack space, according to a spokesman.

The systems, which bring the number of 3300 series members to seven, reportedly seek in 38 msec by providing two read/write heads per recording surface. They also provide 678-track recording media that hold 286 track/in. and 20K byte/track with 6K bit/in., the official said.

Equipped with Winchester technology, the disk drive systems transfer 7.97M bit/sec with one unrecoverable error for every 10^{12} bits.

Both units are said to enclose IBM-type heads and disks plus a rotary positioner in a sealed cavity protected by a positive pressure filtration and cooling system that removes impurities as small as .3 microns in diameter.

Standard features with the 3300 series additions include a Control Data Corp. interface, built-in power supply, direct track addressing, early and late data strobe, track offset and NRZ data interface.

In OEM quantities, the 13M-byte model costs \$2,460, compared with \$3,390 for the 80M-byte model. Okidata is located at 111 Gaither Drive, Mt. Laurel, N.J. 08054.

CPU's Dividends Avert Tax Hikes

(Continued from Page 29)

a Wang 2200 VP with a 10M-byte disk system and a 600 line/min printer; then, heeding advice from the State of Mississippi, he hired a programmer to write general accounting software.

With the resulting system, Creel and his staff automated the county's accounts payable, fund-balance report, summary reports of receipts and expenditures, bond maturity schedules, budgeting, receipt and expenditure analyses, property inventory system, general ledger and investment program as well as its payroll.

As soon as he can raise the necessary funds, Creel plans to program the in-house system to accommodate the county's tax assessor and collector records, which are currently prepared by a time-sharing service.

Since the county computerized its accounting functions, Creel claims to have noticed an improvement in the quality of his department's output. When we deliver monthly budget reports to our department heads, the computer not only itemizes but also shows what percentage of their budgets have been spent for every account under their jurisdiction," he noted.

Another payoff became evident recently when inspectors from the U.S. Welfare Department and the Department of Agriculture made a spot check of the county's food stamp program. "They were expecting to be here most of the day, like with most other counties," Eure recalled. "But we had all the information they needed right in the computer and put it in their hands in less than 30 minutes.

"They went over it, then went over it again before they began shuffling their feet and asking one another what they were going to do for the rest of the day."

What's happening inside your system? SARA will give you a clear picture.

SARA (Systems Analysis and Resource Accounting) is the most efficient and cost-effective diagnostic tool you can use to keep your system at peak performance. It lets you take a critical look at your entire configuration... and pin-point potential problem areas. Try SARA now, for 30 days, and find out just what shape your system is in. Mail the coupon today or, for immediate consultation, call (703) 821-6275 or (800) 336-0135 (toll free).

Boeing Computer Services Company

7700 Leesburg Pike • Suite 201 • Falls Church VA 22043

☐ Tell me more about your 30 day trial.

☐ Send more information about SARA. My system is

☐ IBM ☐ Univac

☐ Honeywell ☐ CDC

☐ other (please specify) _____

Name _____ Title _____

Organization _____ Phone _____

Type of Activity/Industry _____

Address _____

City/State/Zip _____

The best reason to go outside

BCS

BOEING COMPUTER SERVICES COMPANY

A Division of The Boeing Company

DS990 Options Grow

HOUSTON — A 16K error-correcting random-access memory (RAM) and additional packaging options are now available to users of the Texas Instruments, Inc. DS990 line of commercial systems.

With the memory enhancement, users can expand the basic DS990 in the base chassis to incorporate up to 608K bytes of main memory and support up to six CRT terminals, according to company spokesmen.

Error-correcting memory systems using the 16K RAM range in capacity from 64K bytes to more than 1M byte, the officials said.

The packaging options, meanwhile, include 70-in. cabinets for DS990 models 4, 6 and 8 and a 30-in. enclosure for the Model 4.

In addition, TI has expanded its DS990 product line with the introduction of the models 6 and 8 data base management systems (DBMS), which provide dual 25M- and 50M-byte disk systems, respectively. Each addition incorporates a 990/10 computer with 160K bytes of 16K error-correcting RAM, four Model 911 CRT terminals, a 300 line/min printer and the pedestal-mounted disk systems.

In OEM quantities, a minimum 16K RAM costs \$2,880, compared with \$37,920 for a 1M-byte configuration of five RAM boards. Models 6 and 8 DBMS sell for \$71,000 and \$78,500, respectively, from TI at Box 1444, Houston 77001.

User Group's Benchmarks To Ease System Selection

(Continued from Page 29)

package, which users can take advantage of now, the benchmark reporting service is still in the planning stages and probably will not become available until "sometime later this year," Segal said.

Commenting on the benchmark service's prospects for success, the Ascu head noted he has already established a similar program at the Association of Time-Sharing Users (Atsu) — a group he founded three and a half years ago — and the upcoming Ascu venture will be patterned after its successful predecessor.

Formed last April as an Atsu offshoot, Ascu represents a reaction to

the "exceptional" proliferation of small business systems during recent years, Segal explained.

"When we founded Atsu a few years ago, there were only about 50 small systems vendors in the business," he said. "Today, there are literally hundreds of models to choose from — so many, in fact, that the average user or prospective user is just overwhelmed by the number of offerings."

'Incredible' Response

In the approximately four months since its founding, Ascu has already attracted more than 500 members. By the group's first anniversary next April, Segal hopes that figure will have topped 1,000.

"It's just incredible, the kind of response we've been getting thus far," he noted with a chuckle. "I sometimes nearly fall out of my chair when I see the number of membership applications that come across my desk."

Although many of the users who have joined Ascu come from the parent organization, an estimated 50% of the members apparently have no previous association with the DP field. "We've got doctors, lawyers and businessmen — all sorts of people are joining," Segal said. "When I walk down the street or go into a store, people who know about my job tell me they've been considering computerizing their operations for a long time and ask how they can join our group."

Suggestions Welcomed

But despite Segal's interest in swelling the group's membership roster, his main goal through the rest of the year will be to pave the way for the prospective benchmark reporting service. At the moment, he is concentrating on defining the benchmark programs that will someday run on test systems, and to this end he has already begun seeking input from group members.

Depending on the suggestions they receive, Segal and his colleagues will then decide which applications the competing systems will run during benchmark tests, what languages will be used and whether the benchmarks should be CPU- or I/O-intensive and set other test guidelines.

Ascu requires a \$25 membership fee. Users interested in joining the group should write the Association of Small Computer Users at 75 Manhattan Drive, Boulder, Colo. 80303.

Nortek Master Clock Fits DEC Systems

PORTLAND, Ore. — A master system clock from Nortek, Inc. is said to fit the Digital Equipment Corp. (DEC) LSI-11, LSI-11/2 and PDP-11/03.

The "dual width" module combines the features of a DEC KW-11L real-time clock and a KW-11P programmable clock, and adds an RT-11-compatible date and time clock, Nortek said.

An independently powered microprocessor helps ensure that date, time and programmable count are maintained when the CPU is not running, according to the company.

Priced at \$600, the unit is available from Nortek at 2432 N.W. Johnson, Portland, Ore. 97210.

**NOW! REDUCE COSTS
RENTAL AN RKE
WITH AN RKE
SHORT TERM
OPERATING
LEASE.**

• 3270 • 3340 • 3350 • 3420 • No Penalties
• No Buy-outs • Savings Over IBM Rentals

Our short term, no obligation operating lease is the most effective way to increase total output and still maintain maximum cash flexibility. Talk to us. Let us tell you how we can purchase your installed tapes, discs and terminals and lease them back to you — OR — furnish equipment to you from our own inventory at a savings over the cost of renting from IBM. "WE" are the people at RKE who have the special knowledge, finance and inventory to meet your needs today.



R.K. ENTERPRISES, INC.
470 MAIN ST. RIDGEFIELD, CONN. 06877
America's leading
companies depend
on us.

Marketing Centers

SAM ROSSON
(214) 361-8337

BOB LEONARD
(203) 438-9567

DON BRADEN
(713) 367-7170

ALLAN HANN
(215) 667-6340

RICHARD BLOWER
(513) 793-7992

DEALERS PROTECTED

'Always More to Add' Self-Taught Teenager Developing Robot

By Ann Dooley
CW Staff

WESTFIELD, N.J. — In addition to scuba diving, piloting airplanes and doing homework, 16-year-old Tod Loofbourrow has been building a robot that moves, "sees," understands words and is expected to speak any day now.

Loofbourrow has always been fascinated with robotics and when he found that by using a microcomputer-based system he could make his dream of building a robot come true, he "dug right in." Loofbourrow began the project two years ago, working in the basement of his house during summer vacation and after school. But the work on "Mike" is not complete, according to the high-schooler, who added, "It's never going to be finished. There will always be things to add."

Loofbourrow had no background in DP or electronics when he began and admitted that it slowed him up a little. Loofbourrow picked up his information from a variety of manuals, books and other sources and would design and build each part, one step at a time. "I had to discover what each piece needed to do and then I put it all together," he said.

Mike was designed and constructed almost entirely by Loofbourrow himself, with just a little help from his father, who has some electrical engineering background. Although his father and brothers are all interested in electrical engineering, Loofbourrow plans to continue his studies in liberal arts. "Robotics is just a hobby," he maintained.

The robot can operate either in an automatic mode or under the control of an operator using a joy stick, Loofbourrow ex-

plained. It can move forward and backward at five different speeds and can determine if an object is in its path by using ultrasonic sound detectors.

In addition to the simulated sight, Mike can "feel" things by using impact sensors which retract if they come in contact with any object. If something is in Mike's way, the robot will move around it and can even sense an open doorway and move through it, according to Loofbourrow.

Voice Recognition

The robot was also programmed for voice recognition which, according to Loofbourrow, was the most difficult part of the whole project. Mike is programmed to recognize eight words: Mike, fast, slow, stop, come, reverse, right and left.

The voice recognition capability required total revamping of the existing software. Previously, the software was done in a program loop and as each piece of hardware was developed, Loofbourrow would develop corresponding software.

This method worked until the voice recognition was added, so the high-school student

developed a program that would scan for an input every 160 msec for greater efficiency and precision than was possible with the loop.

Loofbourrow used a Kim-1 6502-based, prebuilt micro and then bought the rest of the parts from various computer stores in the area. The system has 9K of memory, and an S-100 bus was added to bolster the memory power. The robot is powered by a car battery and has three motorized wheels — the front one being used for steering. Mike cost between \$400 and \$500 to build, according to Loofbourrow.

"The only real problem I had in building Mike was when I used a diode that was too small to handle the amount of electricity," he said, adding, "You wouldn't believe how much smoke one little diode can make."

Mike consists of two main pieces. The bottom, shaped like an octagon with an impact sensor on each of the eight sides, contains all the main circuitry, and the upper body, which slopes inward, gives the robot a pyramid shape. The robot stands about four feet high.

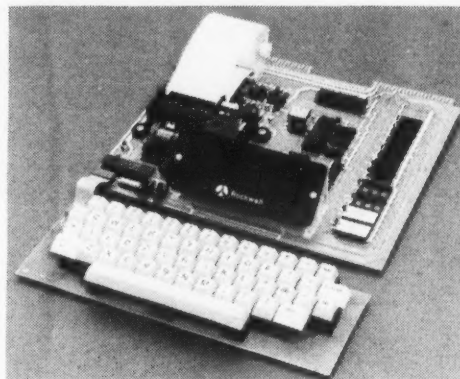
Single-Module Micro System Features 20-Column Printer

ANAHEIM, Calif. — Rockwell International is offering a single-module microcomputer system that features an on-board, 20-column printer.

In addition to the R6500 Advanced Interface Module, dubbed AIM 65, Rockwell has also introduced a one-chip microcomputer, two R6500 interface chips and four options for System 65, the company's dual-floppy R6500 development system.

Intended as an educational aid for first-time users and as a general-purpose microcomputer for engineers, AIM 65 includes an alphanumeric 20-character printer and display and a 54-key terminal-style keyboard.

Available in 1K- and 4K-byte random-access memory (RAM) versions, AIM 65 was designed around the R6502 MPU, which has a 64K-byte address capability with 13 addressing modes and both decimal and binary functions, according to the firm.



Rockwell AIM 65

AIM 65 costs \$375 in the 1K-byte version and \$450 in the 4K-byte version.

Rockwell International's Electronic Devices Division is at 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

Disk Operating System Bows

ANAHEIM, Calif. — Software Dynamics is offering a disk operating system called SDOS for 6800-type microprocessor users with at least 32K of random-access memory (RAM) and floppy disk drives.

SDOS can reportedly support 64K RAM and any number or mixture of disk drives on-line. SDOS also supports sequential disk files, device-independent I/O and a user-customized command interpreter and has the capability to tailor disk drives to adopt to different hardware, the firm said.

Command files allow prepackaged sequences of keyboard commands to be executed automatically, without operator intervention, the firm noted.

Turnkey systems and enhancements can be built by replacing the command interpreter with the desired application package. Utility programs provided with SDOS allow the user to initialize a new disk and to repair accidentally damaged disk file structures, according to the firm.

Versions of SDOS are now available for Midwest Scientific Instruments, Cincinnati

Milacron Model 20, Electronic Product Associates Micro-68 and Wavemate 6800 systems.

Price for SDOS is \$200 from Software Dynamics, Suite G, 2111 W. Crescent, Anaheim, Calif. 92801.

Apple Cuts Prices

CUPERTINO, Calif. — Apple Computer, Inc. has recently lowered memory prices by 40% — a move that translates into lower system prices as well.

The 16K model Apple II, which sold for \$1,445, now sells for \$1,195, the 48K random-access memory (RAM) system now sells for \$1,795, the 32K-byte RAM version costs \$1,495 and the 4K-byte RAM system costs \$970. The 16K-byte memory price is now \$300, down from \$500.

Apple Computer, Inc. is at 10260 Bandley Drive, Cupertino, Calif. 95014.

Micro Chips

Book Covers Personal DP In Investment Decisions

JAMAICA, N.Y. — A book explaining how to develop personal computer-based systems for the support of investment decision-making has been published by Man-Computer Systems, Inc.

Entitled *Low-Cost, Personal Computer-Based Investment Decision Systems*, the book presents general design principles for developing personal computer systems for the investor. The book also explains what a personal computer is, what hardware and software systems are available and how to conduct a cost-effective analysis of computer systems. The book also deals with business applications, information storage and retrieval, recreation, education and various other applications, according to the company.

The 169-page volume is available for \$15 per copy from Man-Computer Systems, Inc. 84-13 168th St., Jamaica, N.Y. 11432.

Catalog Lists 6800 Software

Hemenway Associates, Inc. is offering a software catalog featuring descriptions of 6800 development software including Strubal, a high-level language compiler. The booklet also lists the features of each software product in table form and short introductions explaining the application areas involved. The firm is situated at Suite 8P, 151 Tremont St., Boston, Mass. 02111.

MICROCOMPUTING

EASYTRIEVE relieves the information bottle-neck



Do you get information from the computer when you want it? Every time? Without delay? Or does your data center strain to get the information you request and so vitally need to make decisions?

EASYTRIEVE is a well-proven solution to relieving the information bottleneck.

EASYTRIEVE is the information retrieval software system from Pansophic that requires no coding forms, no complex machine language. EASYTRIEVE works with simple, English key words to produce reports from the computer as fast as the machinery can move. EASYTRIEVE is simple to learn and to apply, yet can be the basis for entire job accounting systems, EDP audit procedures, modeling and financial systems ... the list is endless.

Call us today toll free to find out how EASYTRIEVE users around the world are managing through current, reliable information.

EASYTRIEVE. The award-winning software solution in use at over 1,500 IBM 360/370 data centers across the globe. From the people at Pansophic. Offices near you throughout the world.

PANSOPHIC

709 Enterprise Drive, Oak Brook, IL 60521

800-323-7335



Your in-basket holds more than paper

It seems like everyone sends you requests for reports of computerized data. They sure pile up fast. But you know that behind every one of those requests is a decisionmaker whose job effectiveness rests on being able to make his decisions from information . . . which you can provide.

Does he get it on time? Every time?

If not, EASYTRIEVE can help you do away with the mountain of requests. To get information back to that decisionmaker in record time.

EASYTRIEVE is the free form information retrieval system that works with simple English key words. The system does the formatting, the page-numbering, report dating. It is load-and-go. It is simple to learn and apply, yet can be the basis for entire job accounting systems, modeling and financial systems, auditor programs . . . the list is endless.

EASYTRIEVE, the Datapro Honor Roll software system in use at over 1,500 IBM 360/370 data centers around the world. From the people at Pansophic. Offices near you throughout the world.

PANSOPHIC

709 Enterprise Drive, Oak Brook, IL 60521

800-323-7335





Vector Graphics' Vector 2

Based on Z80

Tabletop MPU Includes Keyboard

WESTLAKE VILLAGE, Calif. — Vector Graphic, Inc. is now offering the Vector 2 desktop computer, which utilizes a Z80 MPU and a built-in keyboard, to hobbyists, OEMs and small business system users.

The Vector 2 was designed around a 158-instruction Z80 and features a low-profile cabinet with built-in keyboard.

Completely assembled and

tested, the standard system includes a 10-slot S-100 compatible motherboard; a Z80 MPU board; a 12K 2708 board and programmable read-only memory (Prom); random-access memory (RAM); and 32K bytes of solid-state memory, expandable to 64K.

It also includes the Vector Graphic Flashwriter video board, power supply, integral

cooling fan and 72-key keyboard with standard typewriter keys, a numeric keypad and several user-definable keys, the firm said.

The unit is said to interface with all standard peripherals. It comes "completely software-supported."

The Vector 2 is priced at \$2,000 from the firm at 790 Hampshire Road, Westlake Village, Calif. 91361.

Systems Include Five Diskettes

WILMINGTON, Del. — Computer Data Systems has introduced two micro-based products, the Businesspak 1 to handle accounts payable and receivable, payroll and general accounting and the Versatile 3 for the office, home or classroom.

The Businesspak 1 utilizes an 8085 MPU, 500K-byte dual disk drives, 32K static random-access memory (RAM) and the Model 761 tel-

Computer Corp.

The Businesspak 1 is aimed at doctors and lawyers as a replacement for billing services and also as a means for accessing time-shared libraries of case histories and the like with the addition of a coupler.

The Versatile 3 is a single-unit system with a built-in minifloppy disk drive, upper and lower case alphanumeric keyboard and CRT, an 8085 MPU and 16K static RAM.

Five diskettes are included

with each system to give the user "immediate programming and applications capabilities."

Disk 1 contains a disk operating system and 12K Extended Basic with easy-to-use statements, along with line editing, multistatement lines and multidimension arrays, a spokesman noted.

Disk 2 contains games; Disk 3 is a home accounting package; Disk 4 is a small business accounting package; and Disk 5 is a formatted, blank diskette for entering programs.

The Businesspak 1 costs \$5,995 and the Versatile 3 costs \$2,795 from Computer Data Systems, 5460 Fairmont Drive, Wilmington, Del. 19808.

Pet Users

Get 'Magazine'

GOLETA, Calif. — Cursor, a monthly C-30 cassette "magazine," will be available for users of the Commodore Pet in early July.

Each issue will feature a game as well as a variety of programs for business, for statistical data analysis and for use in the home, according to publisher Ron Jeffries.

The "magazine" is priced "deliberately low" at \$24 per year to "make it unattractive to rip off the programs," according to the publisher.

Cursor is at P.O. Box 550, Goleta, Calif. 93017.

Apple Users Get Link To Stock Portfolio Of Dow Jones & Co.

CUPERTINO, Calif. — Apple Computer, Inc. said users of its computers can now access stock portfolio information with a telephone link to Dow Jones & Co., Inc.'s Stock Quote Reporter Service.

The 15-minute delayed stock and bond quotations, along with software provided by Apple, will enable the user to determine current portfolio value, short- and long-term gains and rates of return, the company said.

In the future, Apple II users

will also be able to call up current news on companies in their portfolios, Apple said.

The cost of the stock quote service includes a one-time fee of \$25 and a usage charge of \$3 for the first three minutes plus 50 cents a minute after that for each session.

The service is now available from any Apple dealer. Additional information is available from Apple at 10260 Bandle Drive, Cupertino, Calif. 95014.

Hayden Prints Guide To Programming 6800

ROCHELLE PARK, N.J. — A book for 6800 microprocessor users entitled *The 6800 Microprocessor: A Self-Study Course With Applications*, has recently been published by Hayden Book Co., Inc.

The book offers 15 laboratory exercises that emphasize the use of the microcomputer as a controller which responds to input and prepares suitable output, the publisher said.

Designed as a guide to pro-

gramming the 6800, the book covers control applications, micro uses in communications, data acquisition and business DP, as well as flowcharting, data arrays, debugging programs, subroutines and interrupts, according to Hayden.

The book is available for \$5.95 from Hayden Book Co., 50 Essex St., Rochelle Park, N.J. 07662.

Ruggedized Micros Offered

SANTA CLARA, Calif. — American Microsystems, Inc. has introduced the S6800 series of microprocessors, said to be capable of operating at temperatures between -40°C and 85°C in the industrial range and -55°C to 125°C for the military.

The S6800 microprocessors were designed to meet the requirements of manufacturers of automobiles, remote micro-

processor-controlled equipment, avionics and controllers used in extreme temperature environments.

The units are available in ceramic packages in quantities of 100 at a price of \$35.30 for the industrial models and \$68.40 for those in the military range. American Microsystems is located at 3800 Homestead Road, Santa Clara, Calif. 95051.

Teenager Developing Robot

(Continued from Page 33)

Loofbourrow, who has just started his summer vacation, is enthusiastic about working on some new ideas for Mike, such as adding voice capabilities and giving the robot arms. "I'll have to redo all the software again to add a voice. It's going to take a lot of work," he said. The voice will be especially hard because of all the storage that is required. "So right now, I'm looking for someone who has a full-sized floppy he wants to sell."

Mike has definitely added something to the Loofbourrow family life, according to Tod. When the dog first saw Mike, he was really shaken up by it, he recalled. And once when Mike was maneuvering outside, the robot almost caused a car accident because the driver couldn't get over what he was

seeing, Loofbourrow related.

In addition to his work as an inventor, Loofbourrow has written a book about how he designed and built Mike. *How To Build A Computer-Controlled Robot* is published by Hayden Book Co., Inc. of Rochelle Park, N.J., and offers step-by-step instruction for building a similar robot.

Custom Build Your Own Microprocessor System

CPU Board ASYNC I/O Board SYNC I/O Board Memory Board Modem Board



Cabinet with Power Supply

Board Features:

- F-8 CPU with 2K RAM, 4K ROM and 2K PROM
- Asynchronous 2-Channel I/O; Full Duplex, RS-232-C
- Synchronous I/O; Half or Full Duplex, CRC, RS-232-C
- Static Memory with 2K RAM and 4K ROM, 2K PROM
- Static Memory with 8K RAM and 2K ROM, Battery Back-Up
- FSK Modem; TWX/DDDD Compatible, Dial Tone and Call Progress Detection, Multi-Tone Dialing

Cabinet Features:

- Front Panel PC Card Access
- Removable Top Cover for Troubleshooting Ease
- Common-Buss Motherboard allows Random Card Placement
- Rear Panel Cooling Fan and Optional EIA Connectors

For additional information regarding your specific application, call or write UTEC today.

UNIVERSAL TECHNOLOGY INC.
871 Allwood Road, Clifton, N.J. 07012
Phone: (201) 779-0430

UTEC

168

System available
for short
term sublease.

COMDISCO
312-698-3000

Profile of a Newcomer

Two Pi: Playing David to IBM's Goliath?

By E. Drake Lundell Jr.

CW Staff

TUSTIN, Calif. — "DOS IPL Complete." "Those are my favorite words right now," Dr. Jared Anderson, president of Two Pi Co., said here recently as he demonstrated the capabilities of the firm's V32 minicomputer, which will compete with the lower end of the IBM 370 family.

The firm, which has one machine working here and two working in its northern California facility in Sunnyvale, is presently using this system alongside a 370/135, easily switching between the two, using IBM's DOS/VS Release 34.

Nestled in the small Koll Business Center with a Copyrite Press franchise and an Acme Gridley Service, Rebuilding and Parts operation as well as a West Coast pottery outlet, Two Pi hardly seems a challenger to IBM's Goliath. Backed by giant N.V. Philips Corp. of Holland however, Two Pi will be pumping out about 200 of its 32-bit minis in 1979.

A large percentage of those machines will be going to National CSS Corp., which will be selling the units directly to end users with its own IBM-compatible operating system [CW, April 7], but Two Pi is also seeking additional customers for the system, according to Anderson, known to his friends as Jerry.

'Had Idea for Years'

"I've had the idea for years," Anderson said about building an IBM-compatible computer, "but until 1973 or 1974 I couldn't figure out a better way to build it than the way IBM was."

A nuclear physicist by training with a Ph.D. degree, Anderson worked on the team that won the Nobel Prize for physics in 1968 under the direction of Prof. Luis W. Alvarez. But when federal funding for some academic work in the field was cut, he left the position of senior staff physicist at Berkeley's Lawrence Radiation Laboratory and, with a group of other disenfranchised researchers — most notably Lauren F. Yazolino, also of Alvarez's team — decided to find a business that fit their talents — and that didn't require federal money.

The computer business looked good, and the group founded Decision, Inc., which turned a converted Woolworth's store in grimy Oakland into what some called one of the brightest and most casual facilities for administration and manufacturing ever seen

in the computer field.

The firm rapidly became one of the largest independent suppliers — if not the largest — of disk and tape controllers for Data General Corp. minicomputers. Its success attracted others.

In 1974, Decision was sold to Ball Corp. Anderson stepped aside as its president and chief operating officer, a position he had held for four years.

Initially Aimed at 360

While the idea of an IBM-compatible CPU had been percolating in Anderson's mind in the early 1970s, it was not until 1974 and

"the microprocessor revolution" that he began work on putting the idea into reality.

He and Yazolino began "doodling" with ideas on their own time and with their own money, originally thinking of a 360-type machine — hence the company name Two (times) Pi for a 360° circle.

Later, when they decided on 370 compatibility, "it just wasn't worth the trouble to change the name to Two point something times Pi," Anderson said.

Anderson and Yazolino worked with the Monolithic Memories, Inc. 4-bit chip slice, the 6701, with 16 registers, but by the time

(Continued on Page 38)

California Board Under the Gun For Inconsistent COM Taxation

By Tim Scannell

CW Staff

SACRAMENTO, Calif. — Seemingly inconsistent patterns of taxing computer output microfilm (COM) is one of the issues being fought here by the Sales Tax Action Group (Stag), an association of about 150 DP companies with business in California.

COM is sometimes taxed and sometimes not, according to Gary Jugum, an attorney representing the California Board of Equalization.

To date "we have not distinguished between COM and other readable things such as tabulated listings. We've lumped microfilm in with printed matter and distinguished that from tapes, disks and materials that are more machine-readable," Jugum said.

"In most transactions, COM would be nontaxable so long as the operation or processing that occurred was something significant," Jugum continued. Or, to put it simply, "if you have data and put the same data on microfilm, we tax it . . . but if you begin with raw information, then process and compute it, add it up, subtract it or divide it and then have microfilm as your final output, we don't."

There is, however, a great deal of controversy over the particular wording of the sales tax regulations, Jugum said. The law states that work "under contract for the processing of customer-furnished information" is exempt from state taxation. It defines this

processing as the development of original information from raw data.

Specific procedures exempt from the law include "summarizing, computing, extracting, sorting and sequencing." Therein lies the difficulty, Jugum pointed out.

Some COM experts feel the use of mini-computers to reformat and index COM records is a form of "extracting," and COM processed in this way should be exempt from sales tax. However, the Board of Equalization contends the generation of indexing is not the extraction of new data and therefore does not qualify for exemption.

Service Bureau Agrees

At least one COM service bureau, U.S. Datacorp, has agreed with the board's decision on the taxability of COM output. "In our discussions with the board, its use of the word 'extracting' has meant 'to take information and manipulate it in a way that it is returned to the customer as new data,'" according to Fred W. Greb, Datacorp's vice-president of finance.

"COM extracts selective key information to make retrieval easier, but information is returned unaltered — other than the fact that it is on microfilm," he added.

Greb noted that accounting for two categories of jobs, taxable and nontaxable, would produce monumental administrative problems and result in increased costs for customers.

(Continued on Page 38)

Only InSci systems address the full human resource function

Information Science, an established nationwide company is the original developer and principal supplier of Human Resource systems and services.

Personnel

Payroll

ERISA

EEO

OSHA

InSci
Information Science Incorporated

Dedicated Minicomputer
HRS On-Line Systems
IMS Payroll/Personnel System
Batch-oriented HRS

Only Information Science Incorporated:

- has Human Resource activities as its *only* business.
- has 50 of the Fortune 100 companies as clients.
- serves 42 of the nation's 100 largest banks.
- has worked with more than 400 major organizations with a combined workforce of over 5 million.
- has been honored by ICP for selling over \$30 million of Human Resource software.

InSci Headquarters
95 Chestnut Ridge Road, Montvale, NJ 07645 201-391-1600
Menlo Park, CA 415-854-1903, Oak Brook, IL 312-986-6460
San Antonio, TX 512-690-0110, West Palm Beach, FL 305-689-8777

Member SIA  Software Industry Association

WUIS Withdraws Equipment From Commercial Marketplace

MAHWAH, N.J. — Western Union Information Systems (WUIS), a division of the Western Union Teleprocessing Group, is no longer offering its line of microprocessor-based multiplexers and other communications equipment to the commercial market.

The units will now go to Western Union's Digital Exchange System, which will transfer TWX from Bell's facilities to Western Union's.

"The telegraph company is working toward greater independence of the Bell System for its transmission needs," according to Robert G. Finney, president of Western Union Teleprocessing, Inc. The move was

made to assure that all resources of the division can be applied to production of units for the telegraph company, he added.

A company spokeswoman estimated the move will save Western Union several million dollars a year. These funds will be reinvested in research and development, she said.

Less than \$1 million dollars of these products, introduced to the commercial sector about a year ago, are currently installed. However, the spokeswoman said service on the installed products will be handled through Western Union Telegraph Co. and Western Union Data Service Co.

David to IBM's Goliath?

(Continued from Page 37)

they were ready to build, the 2901 chip was available with increased power and capacity, so it was used instead, Anderson said.

Receiving some backing from Signetics, Inc., Anderson and Yazolino, with the addition of two to four others, built a 360-type CPU and channels and had it up and running with the full complement of 360 software.

The next part was "harder than we thought," Anderson now admits. It took another year to implement all of the 370 features on the system, particularly the virtual addressing in microcode.

In the meantime, Anderson, who had had experience with venture capital operations from the Decision days, de-

cided a large company should be approached to back the emerging firm.

"After all, when you're selling a 370 replacement, you don't want to come on like Gus and Willie putting the system together in a garage," he pointed out.

So in 1976 the company was sold to U.S. Philips Corp., a subsidiary of N.V. Philips of Holland, one of the largest electronics firms in the world. U.S. Philips also owns Signetics, Two Pi's early angel.

The Two Pi V32, which stands about waist high with the control switches on the top, incorporates several interesting features, even if not technological breakthroughs.

For one, it uses commercial refrigeration equipment for cooling, with a fan blowing down over the refrigeration coils and the air routed back up over and between the boards in the cabinet.

Another feature is the use of the 2901 microprocessor chip on the channel boards. Each of these boards has four 2901s, essentially giving the channels the power of a 16-bit mini.

The unit relies heavily on microcode, Anderson said, noting the 183 basic IBM instructions are in read-only memory (ROM) while the other instructions and firmware are in RAM storage. Because of this, he said, Two Pi should be able to react quickly to any IBM moves to put more of its software into microcode.

Using a microcoding machine developed by Two Pi, the firm can quickly add to its own microcode to meet any IBM announcements, he added.

California Board Hit on COM Tax

(Continued from Page 37)

"Extracting is a very controversial point that we haven't fully decided on right now," Jugum stated. "We have wavered and told somebody in one instance that using a minicomputer with microfilm output is nontaxable processing, but we're reconsidering that."

A committee consisting of both industry and board representatives was established to study the problem following a public hearing on May 4, during which Stag members asked The Board of Equalization to reconsider Regulation 1502 on sales tax application.

The law, although confusing, will have to remain as it stands for quite some time, Jugum said. "A hearing before the board itself won't be scheduled until such time as the staff here and the industry group come to some agreement or agreement to disagree," he said, "and that I don't think will happen until six months from now, at the earliest."

3270 Series Printer/System

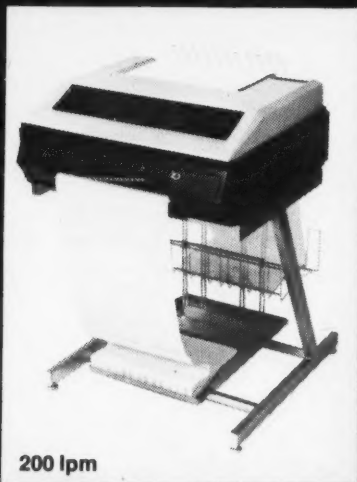
**Tally Printers,
from 120 cps
to 500 lpm,
plug-to-plug
replacement for
IBM 3284/86/88**



500 lpm



300 lpm



200 lpm



120-160 cps

ZETA
CORPORATION

1 West Deer Park
Gaithersburg, Md. 20760
(301) 840-1070

DATA COMMUNICATIONS EQUIPMENT

Name _____
Title _____
Company _____
Address _____
Telephone _____

ZETA Corporation also supplies communications printers which are compatible with Burroughs, Univac, and Honeywell equipment.

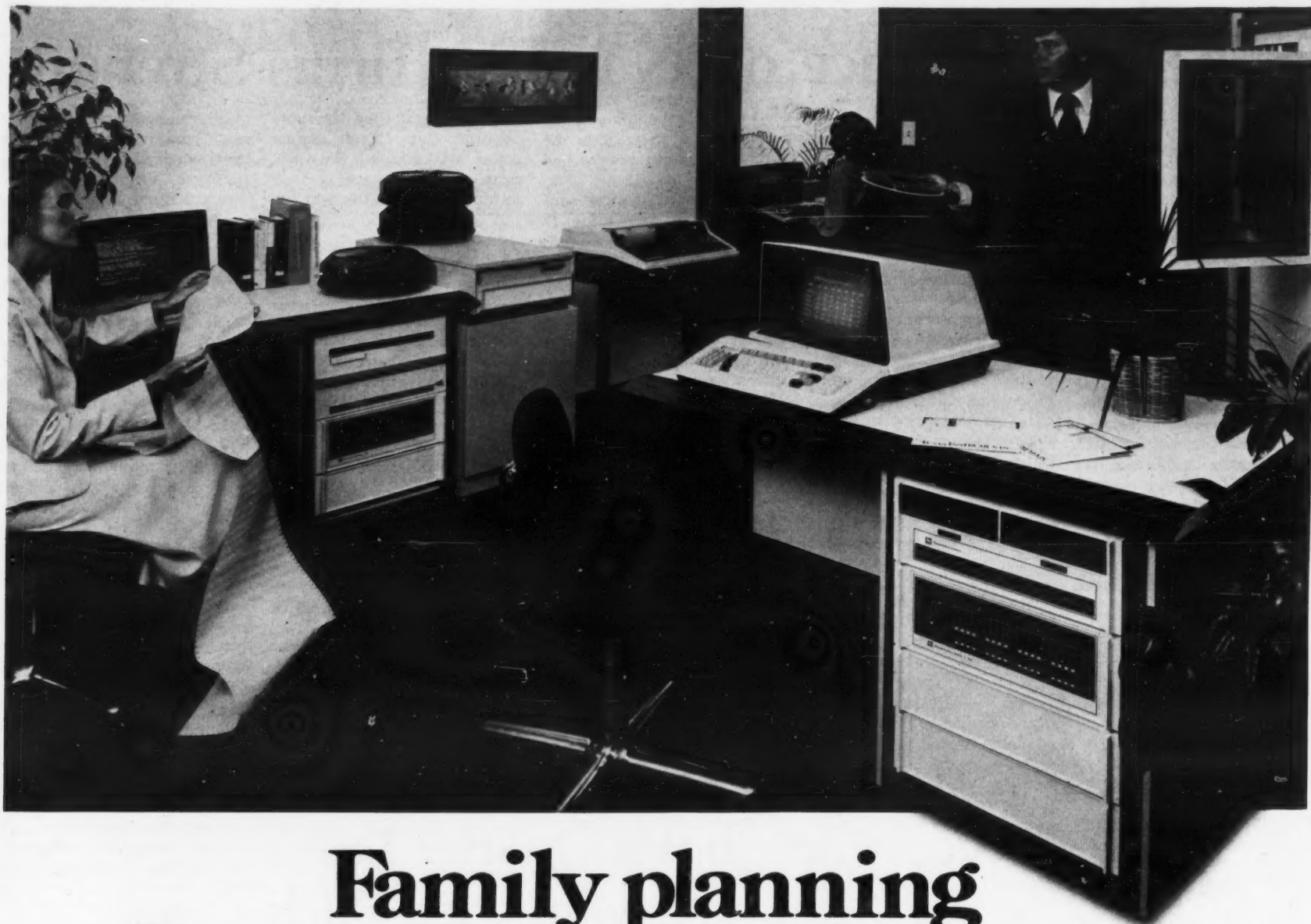
Rental or Purchase plans can be tailored to suit your requirements.

Nationwide service is available.

155-II

Up to two
megabytes
with DAT.
Sale or Lease

COMDISCO
312-698-3000



Family planning allows our computer systems to grow as fast as you do.

When we designed our 990 Computer Family, we put a lot of thought into it. A lot of technology, too.

Our planning paid off. Today, we have large disk-based, multi-user, multi-language commercial systems, like our DS990 System. Its powerful DX10 software has over 170 system commands built in, to make light work of your office workload. Interactive or batch. We also have smaller standalone diskette-based systems, like our FS990 System. And they're all engineered to communicate with each other and to grow as your needs grow.

From the first, our plans called for software that can expand as your business does. So, when we engineered our TMS 9900 Microprocessor, we made it the first to use software that's upward-compatible with our entire line of 990 computers. Compatibility that protects your software investment.

Built into every 990 computer system is over 30

years of experience in the electronics industry, and the technical expertise and support of our worldwide organization of factory-trained sales and service engineers, backed by TI-CARE*, our computer-automated field service dispatching and information system.

With the 990 Computer Family, you are assured of the lowest possible cost of ownership. Low purchase, maintenance and service costs. And reliable operation.

To see how our planning can keep pace with your growth, today and tomorrow, call your nearest TI sales office, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001.

TEXAS INSTRUMENTS
INCORPORATED

*Service Mark of Texas Instruments
Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

We put computing within everyone's reach.

First-Quarter Results Up 95%

Prime's Acceptance on NYSE Affirms Strength

By Marcia Blumenthal
CW Staff

WELLESLEY HILLS, Mass. — Acceptance for listing on the New York Stock Exchange (NYSE) on June 29 was seen as a further affirmation of the continued financial strength of Prime Computer, Inc., which has doubled its revenues yearly since 1975.

In announcing the event, Kenneth G. Fisher, Prime's president and chief executive officer, said, "The NYSE listing culminates six months of physical and financial growth for Prime. In June, the company's \$20 million convertible debenture offering was oversubscribed. The funds raised from the offering will be used for partial repayment of bank obligations and for working capital."

Since 1975, according to a company spokesman, Prime has doubled its sales each year. In 1975, sales reached \$11 million; in 1976, \$22.8 million; and in 1977, \$50 million.

First quarter 1978 results topped \$18 million, representing a 95% growth over the first quarter of 1977. Earnings of

\$1.6 million for the first quarter were 120% more than the earnings for the corresponding period a year ago, the spokesman noted.

Wall Street experts forecast that Prime will continue to grow at 80% to 90% through 1978, and Fisher concurs with that opinion.

The company's stock recently split two for one and its available bank credit line doubled from \$17.5 million to \$35 million through 1980.

This growth in revenue has spurred expansions in both facilities and personnel. In Janu-

ary 1977, Prime employed 520 people. By March 1978, the number of employees reached 1,372.

The continued financial suc-

cess of Prime, the spokesman said, is primarily the result of the company's products and its marketing approach.

Prime claims to be one of the few minimakers that develops software before building hardware.

At the present time, the typical order shipped has a price tag of \$100,000, but the company expects the average sale to hit \$150,000 in the near fu-

ture as users begin ordering the larger-scale Prime models — the 350s, 400s and 500s. A key to the company's marketing success, it claims, is the ability of the marketing force to zero in on the appropriate market segment. "Only 2.5%

of the minicomputer marketplace," the spokesman said, "is psychologically motivated to purchase Prime's products. The customer base receptive to Prime's products is users who have precisely defined what they expect from their systems."

Prime considers itself unusual among mini makers in that it markets 90% of its products directly to the end user. Users are presently split 50/50 between the business DP and scientific/engineering sectors, according to the spokesman.

Financial News

Compuscan Anticipating Pretax Loss

TETERBORO, N.J. — Compuscan, Inc. expects to report pretax losses of \$3.5 million for fiscal 1978 as contrasted with pretax earnings of \$2.1 million for fiscal 1977. Fully audited results for the fiscal year ended May 31 will not be available until August, according to Norman Frank, vice-president of finance.

The losses, Frank said, stem

from lower-than-anticipated sales volume and unexpected price reductions which affected all products.

Reduced sales primarily resulted from software problems related to Compuscan's Start system. Frank explained that the firm spent much of its resources fixing the problem rather than selling systems. This resulted in pressure on

profit margins and an overhead expense in excess of the actual sales volume.

Although the troublesome system has been debugged, Frank noted that the marketing strength behind it will probably be de-emphasized.

Despite its losses, Compuscan is in a position to accelerate its marketing efforts, according to Bruce Bambrough,

chairman, president and chief executive officer.

The company is currently placing major emphasis on the Scanterm, Alphaword and Comap systems. The first two Scanterm systems, designed for the processing of credit card sales drafts, have recently been accepted by two major U.S. banks, the company reported, with initial sales totaling more than \$500,000.

"Our present basic products at Compuscan continue to be well received," Bambrough stated, "with recently developed product lines expected to contribute heavily toward returning the company to profitable operations."

Keydata Attributes Quarter Loss To New Product, Marketing Push

WELLESLEY, Mass. — Keydata Corp. reported a loss of \$54,000 or 2 cents per share for the third quarter of fiscal 1978 compared with earnings of \$127,000 or 5 cents per share for the corresponding period of a year ago. Revenues

for the third quarter were \$3.7 million, up slightly from 1977 third-quarter revenues of \$3.6 million.

Nine-month revenues were \$11.2 million with earnings of \$62,000 or 2 cents per share, compared with 1977 nine-month revenues of \$10.8 million with earnings of \$348,000 or 13 cents per share.

Keydata President L. Edwin Donegan Jr. said these results reflect a substantial investment in new product development and an expansion of Keydata's marketing force. Donegan added that a loss is expected for fiscal 1978.

In particular, Donegan cited a heavy investment in the Keydata Unity series of small business computer systems. The introduction of the Unity series, according to Donegan, represents the first phase of a series of product announcements aimed at adapting new technology to the company's basic business philosophy of delivering totally supported systems to its customers.

"We are continuing our product development efforts with a view toward expanding the range of Keydata DP options available to medium-to-large firms," Donegan said.

Comshare Signs Pact

ANN ARBOR, Mich. — Comshare, Inc. has agreed in principle with Polysar Ltd. of Sarnia, Ontario, to acquire all of Polysar's interest in Comshare, Ltd., an associate company based in Toronto.

Consumation of the agreement, which has been approved by the boards of both firms, will increase Comshare, Inc.'s holdings in Comshare Ltd. from 11% to 79%, the company reported. In addition, the arrangement will increase Comshare's holdings in Comshare International BV (Europe) from 45% to 88%.

Under the terms of the agreement, Polysar will exchange

its 68% ownership in Comshare, Ltd., for 500,000 shares of Comshare, Inc.'s common stock, with an option to purchase an additional 100,000 shares at \$16.50 per share. Comshare, Inc. will also make an offer to acquire the interests of shareholders who own the remaining portion of Comshare, Ltd.

Richard L. Crandall, Comshare, Inc. president, said that all international Comshare companies are expected to produce more than \$44 million in revenue for fiscal 1978 compared with \$30 million last year.

AKD (402) 392-2606
VOLUME DATA ENTRY SERVICES...
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEYDATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

charge!

Get off the routing list and on to the subscriber list. Just take out your American Express, Master Charge or Visa card, find the subscription form bound into this issue, and CHARGE!

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

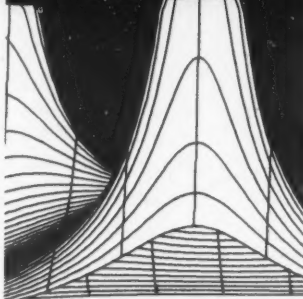
NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

DISPLA
Machine and Device Independent Graphics Software



For Information Call Or Write:
ISOCO
Integrated Software Systems Corporation
4186 Sorrento Valley Blvd., Suite G,
San Diego, CA 92121 (714) 483-0170

Riads Solidly Implanted in Comecon Nations

By Bohdan O. Szuprowicz
Special to CW

World attention has been focusing recently on the continuing military buildup by the Soviet Union and its Warsaw Pact allies, so it seems like a good time to review the latest developments in the art of building and deploying computers by members of the Council for Mutual Economic Assistance (Comecon) — the East European communist nations plus Mongolia.

The 1978 Leipzig trade fair, recognized as the major annual event during which Comecon's most advanced DP achievements are on display, closed only a few weeks ago, and this adds to the timeliness of such a survey.

While the new Soviet Riad computers are basically all third-generation machines with more pronounced use of MOS semiconductor memory and the introduction of MSI TTL technology in some models, their maximum operating speeds are relatively low. The top-of-the-line model is still the EC-1060, now apparently renumbered as EC-1065, which was originally announced as part of the first Riad generation in 1971, but was not even tested until December 1976.

Not until August 1977 did the Soviets announce the EC-1060 in serial production. So far, however, no installations have been identified.

Nevertheless, we recently learned the EC-1060 has a memory that ranges from 2M to 8M bytes and its productivity is claimed to equal that of about 100 of the Minsk-32 computers. There are also some indications it may be destined to become a local time-sharing workhorse for Soviet service bureaus.

In a recent assessment of the future plans of the computer

industry published in East Germany, Soviet economist T. Degtyareva discussed work in progress on a fourth generation of Soviet computers that will have operating speeds in the order of a few hundred million — and possibly even a few thousand million — operation/sec. The largest fourth-generation machines are also reported to have overall storage capacity of about 10M bytes.

Experiments on a fifth generation of Soviet computers based on optoelectronics, such as lasers, LEDs, light conductors and photo cells, are also claimed to be under way in laboratories.

So far the schedule for the long-awaited BESM-10 prototype with but a 12.5 million operation/sec design speed has slipped again — to 1980 — although some Soviet sources keep hinting that a true Soviet "supercomputer" with speeds in the range of 50 million to 120 million operation/sec may also become operational in that year.

As far as the Comecon user is concerned, he still has to rely on the Riad machines that range in performance between IBM 370/138 and IBM 360/68 to 75 models. Given the abundance of IBM applications software that will run under Riad operating systems, however, this may not be so bad a predicament as first appears to a Western observer.

The winner of the original Riad series and still in production is undoubtedly Robotron's EC-1040, which is pro-

duced in East Germany and has been rated at 1.2 to 1.5 times the speed of a comparable IBM 370/145. Last October, the Soviet and Comecon press made much of the fact that the 60th EC-1040 exported to the Soviet Union

ready market within the Warsaw Pact military establishments.

Besides exports of EC-1040s to the Soviet Union, Robotron sold many of those systems to Czechoslovakia, Poland, Hungary and Bulgaria. Elsewhere,

rated at 450,000 operation/sec and uses MOS technology. It will have 16M bytes of virtual memory, the first in a Comecon computer, and a maximum of 2M bytes of storage.

When one considers the EC-1012 and now EC-1015 from Hungary; the EC-1022, the EC-1033, EC-1035 and EC-1050 from the USSR; the EC-1032 and EC-1045 from Poland; and the EC-1020, previously made in the USSR and Bulgaria, suddenly one realizes several thousand IBM 360 and 370 program-compatible systems may be operating in Comecon countries. This in itself is creating new opportunities for sales of Western peripherals and software packages perhaps even greater in value than the original hardware market of previous years. The Riads are in.

International News

was installed in time to celebrate the 60th anniversary of the Soviet revolution.

Robotron's Elektronik Division plant, responsible for the manufacture of the EC-1040, was awarded a special title as an "Enterprise of Excellent Quality Craftsmanship," which allows it to put the coveted "Q" mark on their products.

The Soviet Union so far is the largest buyer of EC-1040 computers outside of East Germany and has been importing these machines since 1974. Interestingly, the latest EC-1040 installed in the Soviet Union went to Tatneft, an oil production enterprise in the Tatar Autonomous Soviet Republic. It became the eighth EC-1040 operating in the Soviet petroleum industry.

Another three EC-1040s are in use at the Dubna Nuclear Research of the USSR.

These prestigious and strategic EC-1040 installations in the Soviet Union give us some idea of their significance within the Riad manufacturing program. It may well be that the EC-1040 also has a

two EC-1040s were sold to Iraq and one each to Yugoslavia, India, Cuba, the U.S. and reportedly even to the People's Republic of China.

The EC-1040 is such a success that apparently it will continue in production for some years to come, even though Robotron has already announced its EC-1055 model, scheduled to go into production in 1979. That machine is

Contracts

Recognition Equipment, Inc. has received a contract from the Social Security Administration for the lease of six Input 80 systems with a purchase value of \$7.3 million. Payments under the lease of the six systems over the five-year life of the contract would total approximately \$9 million, including related software and maintenance charges.

Bunker Ramo Corp.'s Electronic Systems Division has received from the Rome Air Development Center, Griffiss Air Force Base, N.Y., a \$15.1-million contract with an option for an additional \$5 million. This contract is for the design, engineering and production of 37 AN/GYQ-21(V) DP systems to be delivered to Department of Defense facilities in the U.S. and overseas.

Canada Systems Group has been awarded a three-year agreement by Domestic Canada Ltd. of Oakville utilizing

the MSA Accounts Receivable and General Ledger application products. The value of the contract is approximately \$90,000.

Scott Paper Co. and Sun Information Services Co. have signed a contract for Scott's use of Sungard, a proposed backup and recovery capability designed by Sun for large-scale IBM system users.

NMF, Inc. has signed long-term agreements to provide computerized trust accounting services to six banks: First National Bank of Venice, Fla.; First National Bank of Missoula, Mont.; Amalgamated Trust & Savings Bank in Chicago, Ill.; First Hardin National Bank of Elizabethtown, Ky.; Third National Bank of Ashland, Ky.; and the Baker-Boyer in Walla Walla, Wash.

The Data Tech Division of Penril Corp. has been awarded a contract from Ferranti Ltd. of England for nonvolatile ferrite core memory systems. The contract is valued at more than \$550,000.

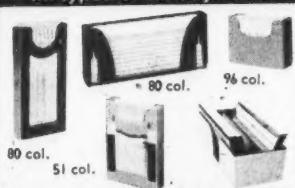
TONE 3 IS HIGH PERFORMANCE-LOW OVERHEAD **TSO for VS1** CHECK THESE FEATURES

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO commands
- Enhanced 3270 usability
- Full ASCII terminal support
- No user swapping
- No TCAM
- No VS/2 overhead

TONE
SOFTWARE CORP.

Write for Details 1124 N. GILBERT
ANAHEIM, CA 92801
(714) 991-9460

Tabcard Holders supplying holders for all types of D.P. systems



BEEMAK PLASTICS

7424 Santa Monica Blvd.
Los Angeles, Cal. 90046, (213) 876-1770

BLIS/COBOL MULTIUSER OPERATING SYSTEM

writing interactive
MANUFACTURING APPLICATIONS
 for mini's
 has never been easier

For information call today...
IP
 Phone (305) 647-2200 USA
 TWX/Telux 810-853-5033
 1850 Lee Rd., Winter Park
 (Orlando), Florida 32789

Available for short term lease.

370/145
 370/138, /148, /158
 3031, 3032, 3033

Let Greyhound demonstrate cost-savings for you while meeting your computer needs.

800-528-6113



Greyhound Computer Corp.
 Greyhound Tower
 Phoenix, Arizona 85077

Dealer Nets Advised for Small Systems Area

BURLINGAME, Calif. — Suppliers of small business systems should follow the example of the automobile industry in organizing for future expansion, according to the president of one of the nation's fastest growing suppliers of such systems.

"Dealership networks composed of small, locally entrenched entrepreneurs who fully understand their responsibility for success and failure in a local market are what made automobile companies successful. And that same approach is what will make small business system suppliers successful," Joseph A. Walsh, president of Shasta General Systems, said.

"Where would Ford or Chevrolet be today if it had to recruit and motivate thousands of managers, each with the

commitment to selling, administering, financing and developing a local branch sales office?" Walsh asked.

Three Elements Needed

In establishing a dealership network, small business equipment suppliers must provide three specific levels of support in addition to a product that is technically very competitive, Walsh said.

The first is a confidence-inspiring brand-name product. Shasta, Walsh noted, is the exclusive U.S. distributor for the Diablo 3200 system, manufactured by Diablo Systems, Inc., a Xerox company.

The supplier must also provide application systems for specific market needs. Those systems must be thor-

oughly proven and virtually turnkey when installed.

A third prerequisite is the creation of a financing support structure with terms, conditions and financing techniques that allow the dealer to market products aggressively with minimal negative impact on his cash reserves and cash flow.

"With these three factors working for him, the knowledgeable dealer will be able to create a sales, service, maintenance and customer support program in his local market that a national company working under traditional support overhead constraints could never provide," Walsh claimed.

In particular, totally workable software that is packaged and distributed on a continuing basis is the dealer's

key entry into new accounts, Walsh said.

For its dealers, Shasta provides two types of software support with its Diablo 3200 hardware. Systems software, including disk operating systems, system utilities, compilers and file handling routines, is provided with every system. In addition, a library of proven, documented applications software systems is made available in two forms: fully documented application systems designed and developed by Shasta and packaged for easy demonstration and installation by the dealer; and applications developed by dealers which are catalogued and written up by Shasta and then redistributed throughout the dealership network.

Shasta currently offers 15 systems to its dealers, more than half of which are its own complete systems. "We are releasing major applications systems into the dealership network each month; and we expect that rate to increase as more accounts develop new applications," he said.

Among the applications systems Shasta currently offers to its dealer networks are order entry, billing, sales analysis, inventory reporting, accounts payable and receivable, payroll, general ledger, financial reporting, accountant client reporting, medical management systems for group practices, job accounting and bill of material/manufacturing management systems.

Volume to Triple

Walsh's company, which he describes as a "value-added" distributorship, has grown more than \$5 million in value of equipment shipped in the past nine months by cultivating and supporting a dealership network that currently covers 40 metropolitan markets and consists of 32 separate dealers.

Shasta dealers, he said, have been actively marketing less than an average of four months because of the growth and development phase the company has been in throughout 1977. "We expect our volume to increase threefold to over \$16 million in 1978," Walsh predicted.

The typical Shasta dealer, Walsh noted, has nearly 10 years experience in selling and installing end-user computer products or services, tends to be well-known and highly respected in his local market and has a financially strong position.

"Introducing our shiny, new, high-performance systems software."

Is it worth the price?

When you're ready to change your system, choosing the right package can be tricky business. Up the speed and you up the cost. Lower the cost and you reduce capability. Where is the happy medium between performance and expenditure? Find out! In our July 31st supplement: *Systems and Utility Software*, edited by Brad Schultz. Featuring tutorials and applications stories as well as late-breaking news, we'll be concentrating on finding the best ways to cut the hidden costs of using and maintaining systems and utility software, especially in the area of:

- Resource allocation
- Program sequencing
- Merging/Sorting of Data
- Control of access
- Compilation

If you're an MIS executive, DP Manager, Supervisor or Programmer, you'll find our July 31st report especially valuable. If you market systems or utility products — your ad should be there. Closing date is July 14th. Or, to reserve space, call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Ron Evans
Frank Collins
(617) 965-5800

New York
Don Fagan
Frank Gallo
Peter Senft
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 421-7330

Los Angeles
Judy Milford
Bill Healey
Jim Richardson
(213) 475-8486

SALE

DECwriter II Model
LA-36 DE With Built-in
DEC Acoustic Coupler

\$1,645.00

Full DEC Warranty
Fully Serviced by DEC
F.O.B. Park Ridge, Illinois
OFF-THE-SHELF-DELIVERY

\$1,645.00

Also available: DEC VT-100, LS-120, LA-180,
Teletype 43, ADM3, TI-745, and more.
Order now, from our stock.

**management response
corporation**

660 busse highway
park ridge, illinois 60068
(312) 698-3377
in watts (800) 323-2135
8362 s.w. nimbus ave.
beaverton, oregon 97005
(503) 641-5500

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

PROGRAMMER/ANALYSTS

Accepting the challenge
is your job...
Providing the challenge
is ours.

Challenging opportunities are available for professional programmer/analysts with at least six months experience... we're growing to make room for you.

Send resume to:

Informatics Inc.

1121 San Antonio Road
Palo Alto, CA 94303
Equal opportunity employer

SYSTEMS PROGRAMMER

Multi plant mfr. located Central N.Y. needs expert in providing software support for sophisticated applications area. Min. 4 yrs. total D.P. exp. with current systems prog. abilities. Bkgrd. must include lge. IBM shop; ideal is MVS + thorough knowl. of internals. Communications helpful. \$28,000. (Fee paid.) Contact P. Siegal.

ROBERT HALF PERSONNEL AGENCIES

1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202
(716) 842-0801

WANTED:

PROGRAMMER/ANALYST

An aggressive individual is needed in the programming, support, and continuing software enhancement of a minicomputer based system which will be installed in numerous business locations. Facets of this unusual system range from real time processing to commercial applications concurrent within a single computer. Experience in minicomputer programming is a requirement. First consideration will be given to those who are:

Familiar with NOVA computers and RDOS
Proficient in FORTRAN
Familiar with commercial applications
Challenged by an unconventional systems approach which requires creative skills

This \$150,000,000 Company is located in Greenville, South Carolina. It still has a small management nucleus and provides an unusually good working environment.

Contact Chris Malle collect (803) 242-6101.

PROGRAMMER ANALYST

Use your experience to become involved in financial applications for growing corporation. Background should be COBOL, BAL oriented utilizing medium to large scale IBM mainframes. Company provides internal advancement. \$15K - 19K Fee Paid. Vicki Anderson, E.D.P. Specialist, Snelling & Snelling, 1422 Anthony Wayne Bank Bldg., Ft. Wayne, IN 46802. 219-424-6376. A licensed employment agency.

engineering

Design the Digital Telecommunications Systems of the Future!

The first steps have been taken here at GTE Automatic Electric Laboratories.

**CALL TOLL FREE
(800) 323-1966**

In Illinois (800) 942-0491

Monday thru Friday from 8am to 5pm cdt

The real-time, computer controlled telephony process systems that are already on-line at GTE Automatic Laboratories, represent the state of the art in telecommunications, and in distributed processing digital systems. Our assignment: to conceptualize tomorrows needs, and develop the systems to meet them... These are key ground floor openings:

APPLIED RESEARCH

Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment:

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

SYSTEMS DESIGN

New Feature Design - Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design - Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Schottky, TTL as well as Static and Dynamic MOS.

International Design - Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software - Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/1.

Support Software - Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software - Large scale development in telephone system real-time control Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with a challenging new frontier in computer technology, talk with us.

If unable to call, send resume including recent salary history to:

Manager of Technical Employment, Dept. 471 A6



**AUTOMATIC ELECTRIC
LABORATORIES**

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

**Make
the
Switch!**

position announcements

position announcements

position announcements

position announcements

position announcements

EDP Security Officer

AiResearch Manufacturing Company is in the process of designing and installing a complete data security, physical security and contingency recovery program. An opportunity exists for an experienced, knowledgeable individual to establish the security program, perform risk analysis, design a contingency recovery program and install and supervise security techniques and procedures in a large-scale business/scientific computer installation.

Knowledge of IBM OS and CDC scope operating systems and software, password techniques, data security techniques, documentation standard development, risk assessment methods and physical security requirements and procedures are desirable.

Excellent fringe benefits, competitive salary and opportunity for advancement. Send your resume to: Mr. Carl Tindell, Employment Manager.



**AIRESEARCH
MANUFACTURING CO.**

402 S. 36th St.
Phoenix, AZ 85034.
An Equal Opportunity Employer M/F



POSITIONS NATIONWIDE CALL TOLL FREE 800-426-0342

CAD/CAM SPECTo 30K
Need systems & marketing people with mfg. background. Degree required.

CICS APPL. PRGRSTo 24K
Two yrs. experience req. Several openings.

COBOL PROGSTo 21K
Several openings all industries.

SALES/MKTG REPSTo 35K
Degree + 3-5 yrs. experience. Selling Timeshare, Minis or Software.

SYSTEMS PROGSTo 30K
Several openings in Midwest, Sunbelt and California.

BILL ISGRIG
PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

INTERNALS

OS MVT SYSGEN\$22M
1 yr. exper. needed-will train on 370/k68 MVS Internals.

VM INTERNALS\$26M
TSO\$25M
Seek Internals of TSO- on IBM OS

HARD. ANALYST\$27M
2 yrs. NCP - 3705 network design.

CDC SCOPE\$26M
Needs KRONOS-Accept SCOPE Exper

PERFORMANCE ANALYST\$24M
Seek exper. using probe & Exits

CICS GEN'S\$26M
Must be able to write effectively and prefer OS Internals exper.

EDP AUDITOR\$15-42M
We have over 80 openings.

EXEC 8\$25M
Customer Interface position desires 2+ yrs. exper. on 1100.

NJI or NJE\$25M
NJ/NJE and any OS exper. needed.

DOS to OS\$18M
Seek person to be Mgr. in 370/148 Shop. Must Sysgen Sys.

DOS-CICS

We have over 50 openings for Internals exper. Mini, Honeywell and others. Call Skip.

EDP SEARCH

P.O. Box 12566
Okla City, OK 73157
(405) 525-8833

ALL YOU

EDP MANAGERS

Are YOU tired of the 9 to 5 Ivory Tower syndrome???

BREAK LOOSE and earn more dollars by selling computer ribbons.

YOUR sales earn high commissions full or part-time.

Call GREG (516) 931-3120

OVERSEAS ADVENTURE \$40K+

IRAN

Applications programmer, Systems Engineer, H-6000 or L/66, GCOS/COBOL/GMAP IDS TPE/MULTICS, US firm has 18-24 mo tours w/fam. Ex financial pkg in Tehran. Ski 1 hr fm office. Rusa resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101. (703) 356-1997. Other positions avail.

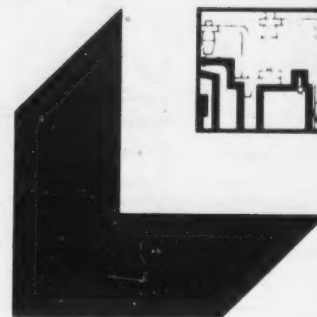
The EDP Specialist TRIMBEC INC. (Agency)

Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing Field. Send resume, salary history and geographic preference to the attention of Adele Durham, Data Processing Division. All inquiries will receive immediate response.

7143 Henry Clay Blvd.
Liverpool, N.Y. 13068
(315) 451-4220

WE KNOW THE PEOPLE
YOU NEED TO KNOW

MANAGER SOFTWARE ANALYSIS



We are an international manufacturer of machinery seeking an individual who will assist in the installation of a CICS system. The person will also be responsible for modifying and maintaining our operating systems (IBM 370-145).

A thorough understanding of ASSEMBLER (BAL) and a working knowledge of ANSI COBOL are essential. A related degree and at least 4 years manufacturing experience are required. Candidates having a DOS/VS background, CICS experience and exposure to an IBM operating environment will be given preference. We offer a competitive salary, a comprehensive benefits package and excellent career opportunities.

Send resume in confidence to:

G. Teich
Industrial Relations Dept.

LEESONA[®]
CORPORATION

333 Strawberry Field Road
Warwick, Rhode Island 02887

An Equal Opportunity Employer M/F

BUILD YOUR CAREER WITH Vepco

Virginia Electric and Power Company, a major southern public utility, has outstanding career opportunities for individuals who will help design computer and micrographic systems for documentary file control and retrieval in the following areas:

STATISTICAL ANALYST

Requires a degree in statistics, mathematics or operations research and 4 years experience in the application of statistical analysis.

PROJECT ANALYST

This position requires a degree and 5 years of data processing experience with emphasis on data base (IDMS) and business applications. You will be involved in implementing, operating, and maintaining hardware and software computer systems, technical analysis to select hardware/software systems, monitoring system operation, developing systems manuals for use and programming instruction, developing flow charts and system specifications for programming under development, coordinating with users to satisfy their requirements, and directing new system application testing and checkout.

PROJECT ACCOUNTANT

Requires at least a 2 year degree in accounting, a minimum of 3 years of construction accounting/property record experience, and a familiarity with computerized accounting systems. Responsibilities include implementing accounting methods and procedures, ensuring that costs are collected, recorded and reported, and generating information reports to accurately describe project costs and commitments.

STAFF ACCOUNTANT

We require a 4 year degree in accounting, a minimum of 5 years construction accounting and property record development experience, and familiarity with computerized accounting system applications. Your responsibilities will include implementing and monitoring accounting's services, monitoring and lending technical assistance to the collecting, recording and reporting of project expenditures, and generating expenditure reports indicating committed costs, expenditures, and cost to complete for each major system activity classification.

We offer excellent salaries, complete benefits, and unique opportunities for advancement. For immediate consideration, send your resume and salary requirements to: Professional Recruiting, Section 60:

Vepco

Virginia Electric Power and Light Co.
P.O. Box 26666, Richmond, Va. 22261

An Equal Opportunity Employer

LEEDS & NORTHRUP

The Careers:

Scientific Programmers

Software Engineers

Software Management



The Experience:

Any Combination Of
**FORTRAN OR
ASSEMBLY ON
MINICOMPUTERS OR
MICROPROCESSORS**



The Opportunities:

**DEVELOPMENT
APPLICATIONS
SYSTEM DESIGN
MAN/MACHINE INTERFACE
COMMUNICATIONS
SUPPORT PROGRAMS**

**All On Real Time
Control Systems**



The Company:

LEEDS & NORTHRUP

An international leader in energy management computer systems.

To investigate your career with an established growth company call anytime 24 hours a day including Saturday and Sunday (215) 643-2000, Ext. 2010 or send your resume to: Jim Henderson, Manager of Professional Employment, Systems Group, Dept. C-3.



LEEDS & NORTHRUP

Dickerson Road—North Wales, Pa. 19454
Equal Opportunity Employer, M/F/H

position announcements

position announcements

position announcements

position announcements

position announcements



APPLICATION DEVELOPMENT (ACP) IN COLORADO SPRINGS

JUNIOR AND SENIOR PROGRAMMERS

ANALYSTS

PROJECT LEADERS

Federal Express is opening a Data Center in Colorado Springs in August of this year. A system is being developed which will operate under the Airline Control Program and will service upwards to one thousand on-line terminals.

Successful candidates will have a thorough knowledge of Assembly Language Programming and a minimum of one year's experience under ACP as a prerequisite.

Federal Express, America's Airline for Packages, offers excellent compensation, a benefit package which includes interline travel and flight privileges on cargo planes, and advancement opportunity in a growth-oriented, creative environment. To apply, send confidential resume, including salary history, to:

Brenda Douglas, Manager of Personnel

FEDERAL EXPRESS CORPORATION

AMP Box 30167 (CW)

Memphis, TN. 38130

Equal Opportunity Employer m/f

PROGRAMMERS/ ANALYSTS

United Airlines offers immediate opportunities for programmer/analysts and senior programmer/analysts to assist in the design, development and implementation of inventory, production and financial control systems at its San Francisco Univac 1100 facility.

These systems will be designed to run using DMS-1100 and TIP/CMS. Applicants should have extensive ANS/ABII COBOL experience, and preference will be given to candidates who are transaction-oriented, with data base management and Univac experience.

United offers excellent salaries and attractive fringe benefits, including reduced rate transportation.

Applicants meeting the above qualifications should send resumes to Employment Manager, United Airlines, San Francisco International Airport, San Francisco, CA 94128. Or call collect (415) 876-6417 or (415) 876-4131 to arrange an initial interview. United is an equal opportunity employer.



UNITED AIRLINES

Senior Software/Hardware Design Architects

An invitation to join one of the most ambitious and creatively challenging architectural undertakings ever launched at NCR.

NCR is now assembling what may well be the most able and farsighted architectural teams in the country. The new highly select group we're forming will be charged with no less than the creation of a systems architecture that will cover the full spectrum of business data processing requirements. The work it does — the decisions it makes — will be the basis of NCR's future far into the 1980's.

Vanguard of VLSI technology

As part of this highest priority pioneering effort you'll be shaping an entire new generation of transaction-oriented distributed processing systems. You'll be working with the newest NCR mainframes, and latest EDP concepts including state-of-the-art data communications, distributed networking and transaction processing, and new PASCAL-based languages.

Architecture in the broadest sense

You won't be simply modifying existing systems or solving narrowly defined problems. You'll be interacting with various engineering and software organizations within the corporation. Your strategic and architectural decisions will determine the requirements for multi-plant implementation of systems and subsystems. Your only constraints will be present system compatibility and broad marketplace realities of the future. You'll have more creative freedom than you've ever had before.

Specific backgrounds needed

You'll be working at NCR's highest technical levels. We're seeking systems architects with a minimum of 8 years of experience in the following areas: open-ended multi-processing; distributed processing; distributed data bases; transaction and interactive processing; concurrency control; backup and recovery; reliability-privacy-security; languages and protocol standards; and migration engineering.

San Diego Lifestyle

NCR's pioneer development group is located in Rancho Bernardo, 22 miles up the coast from San Diego. Our 115-acre hilltop headquarters has been called "one of the 10 best-designed industrial facilities in the nation". We'll give you a working and living environment that's the envy of the EDP industry.

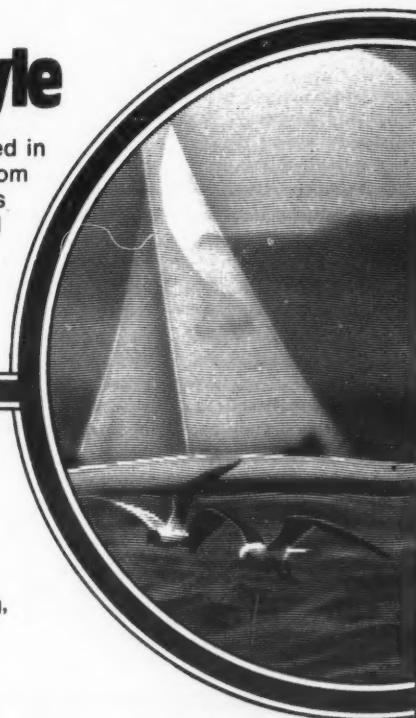
Interviews arranged quickly

For a high level review of your qualifications, and a prompt in-depth briefing on your future at NCR, send confidential resume and salary history at once to: Mr. Frank Drdek, Manager, Personnel Resources, NCR Corporation, Systems Engineering, 16550 W. Bernardo Drive, San Diego, CA 92127.

NCR

Complete Computer Systems

An equal opportunity employer



position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS AND PROGRAMMING PROFESSIONALS

American Fletcher Corporation of Indianapolis, Indiana, is now in the process of expanding its data processing operation.

American Fletcher National Bank, Indiana's largest bank, is the principal subsidiary of this one-bank holding company. Total assets of the Corporation are well in excess of \$2 billion.

AFNB is committed to continued technological growth, as evidenced by our on-order position of two 3032's which will be operating in an MVS environment with TSO.

American Fletcher offers the opportunity to:

1. Be a major contributor to the future growth of the Corporation.
2. Realize your full potential.
3. Be compensated based on your abilities and experience.
4. Participate in a comprehensive benefits package.

We are looking for programmers and programmer/analysts. We prefer applicants with two or more years programming experience in an IBM 145 environment and above, using OS to MVS software systems and languages of COBOL, ALC, or PL-1. On-line CICS experience is desirable.

If you are interested in pursuing a career at American Fletcher, we invite you to investigate the possibility of a match between your experience and our current needs.

For consideration, call collect during business hours at (317) 633-2218 or send us your resume including salary history. All resumes will be held in strict confidence.

David R. Broady
Personnel Division
Data Processing Recruiting

AMERICAN FLETCHER NATIONAL BANK

450 East Washington Street
Indianapolis, Indiana 46277
an equal opportunity employer

Creative, aggressive programmer/analysts are thriving at NCR-San Diego.

If your S/W background qualifies you for a heavyweight role in developing new approaches to interactive, transaction processing financial systems, we'll give you all the independence and creative elbow room you could ask for.

You'll be joining a small (200 people) division that's pioneering bold, imaginative techniques in OS and data communications, and enjoying exceptionally high corporate-NCR visibility. You'll find a loose, easy modus operandi in the stimulating company of top software professional. On top of all that, you'll be working in Torrey Pines - a postcard state park setting that's a mile from the ocean and minutes away from La Jolla and downtown San Diego.

Staff expansion has generated immediate openings in the following areas:

Disk Utility

Disk initialization; sector formatting; strong I/O system software.

Applications S/W

Banking/finance applications; on-line access methods; new development; COBOL 74; data development; report generation.

OS

Process communication; job and task management; job scheduling; resource allocations.

Communication S/W

Telecommunication networking; network configuration; configuration management.

I/O Driver S/W

Physical level I/O; control S/W for variety of new peripherals.

Please send detailed confidential resume and salary history promptly to: Cesar Namba, NCR Corporation, Systems Engineering/Torrey Pines, 4045 Sorrento Valley Blvd., San Diego, CA 92121.

An equal opportunity employer

NCR
Complete Computer Systems

BORED WITH ROUTINE TASKS?

Looking for Opportunities To Be Creative? Then Come To the Bluegrass State

The Urban-Studies Center, an applied research institute at the University of Louisville, is searching for a talented professional skilled (by training and/or experience) in the use of computers in analytical, systems-oriented research related to public planning and policy development. Must be able to function successfully in a multidisciplinary team context, and assume responsibility for computer applications in a variety of projects involving systems development and data basing. Masters Degree required as a minimum consideration given for experience where comparable knowledge and abilities can be acquired. Teaching not required but encouraged, time permitting. Must know one or more structured programming languages, e.g., PL/I, ALGOL, SIMULA, SAIL, etc. Experience or training on DEC 10 preferred (IBM OS/370 background desirable) \$14-16K. If interested in working in dynamic environment write:

University Personnel Services
University of Louisville
2323 South Brook Street
Louisville, KY 40208
An Equal Opportunity Employer

DATA PROCESSING SUPERVISOR

Northeastern Illinois School District seeks Director of Management Information Systems. Duties include: Systems Analysis, Supervision of Programming Computer Operations relating to the District's business functions and instructional programs, including research activities and pupil recordkeeping.

Minimum 2 to 3 years experience preferably in an educational environment.

Salary open, excellent benefit package available.

Send resume and salary history to: Paul F. Swinford, Deputy Superintendent, Valley View Community Unit School District 365-U, 636 Dahlhart Avenue, Romeoville, Illinois 60441.

SYSTEMS ADMINISTRATOR

Responsible for maintaining the operating system software for a large-scale DECsystem-10 installation. The selected candidate will be responsible for installing, modifying and maintaining the TOPS-10 monitor, compilers and utility programs. He/She will have knowledge of communications and remote batch software and will have the authority to hire and supervise an assistant who will provide technical backup. The selected person will report to the General Manager and will become an equal member of a hardware upgrade study team.

Copley Computer Services, Inc., provides business data processing services for Copley Newspapers and the Corporate Offices. CCSI is located in the beach area of San Diego and offers excellent benefits, including company paid medical, dental, and retirement plans, and a 35-hour work week. Salary to \$27,600. Will pay relocation expenses.

Qualified applicants are invited to send confidential resume with complete salary history to our office or call (714) 272-6800 between 10-4 Monday thru Friday. Ask for Sam Hunt, General Manager.

COPLEY COMPUTER SERVICES, INC.

P.O. Box 9860
1253 Garnet Ave.
San Diego, CA 92019

Equal Opportunity Employer

FAST GROWING

Sacramento based company seeking a hard working applications programmer/analyst with 1+ years experience on an HP 3000. Opportunity, working environment and benefits excellent. Send resume, salary history and references to:

Data Processing Personnel

P.O. Box 255365
Sacramento, Calif. 95825

CSC

PROGRAMMERS SYSTEMS ANALYSTS ENGINEERS



YOU COULD BE ONE OF THE STARS at the Applied Technology Division of CSC!

Join one of our space research programs...

We provide information systems technology programs to government agencies, and we're part of a team of 9,000 professionals at the top of our industry. We invite you to investigate your future in the state-of-the-art in our organization. After your interview, you will know exactly what you have to gain by joining CSC...

National Space Technology Laboratories Bay St. Louis, Mississippi

Outstanding career opportunities exist which involve medical data communication via satellite, radar data studies, Space Shuttle testing, and a full range of data management systems. Systems and Electronics Engineers - digital/analog circuit design, instrumentation, telemetry, hardware/software analysis, communications systems. Marine Systems Engineers - Electrical and Mechanical. Scientific Programmers - Fortran experience on any 3rd generation computer, U-1108, CDC 6600, and IBM 360/370 preferred.

Ames Research Center, Mountain View, California

Exciting and rewarding opportunities in support of real-time flight simulation for commercial and military aircraft, simulation technology, piloted aircraft simulation, and analysis of instruments aboard unmanned spacecraft. Applications Engineers - Fortran programming experience. Systems Programmers - CDC 7000 experience. Computer Systems Engineers - Xerox 6 series or PDP-11 series.

Marshall Space Flight Center Huntsville, Alabama

Immediate positions available involving computer systems conversion, computations for launch and flights, simulation of various shuttle functions and other aspects of mission analysis. COBOL Programmers - U-1100 preferred. Fortran Programmers - IBM 360/370 preferred.

For immediate consideration, please send resume in confidence to:

Gus Siekierka
Director, Industrial Relations

COMPUTER SCIENCES CORPORATION Applied Technology Division
6565 Arlington Boulevard
Falls Church, VA 22046
Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

LIVE AND WORK IN DALLAS, TEXAS WHERE EVERYONE WANTS TO LIVE MEDICAL COMPUTER SYSTEMS, INC.

Announces a State-of-the-Art NEW DEVELOPMENT PROJECT

MCSI, the industry leader, is a specialized computer service company engaged in the design, implementation and operation of various EDP systems for over 200 health care institutions nationwide. New projects are being aimed at developing a major on-line information system.

REQUIREMENTS - Heavy experience with ALC, COBOL, CICS and IMS on IBM 360/370 systems.

KEY POSITIONS OPEN:

- PROGRAMMER/ANALYST
- PROJECT LEADERS
- DATA SUPPORT SPECIALISTS
- TELECOMMUNICATION SOFTWARE SPECIALISTS
- DISTRIBUTED DATA SYSTEMS PROGRAMMER/ANALYSTS

MCSI offers an outstanding compensation package. Send resume including salary history, in strict confidence, or call (214) 638-2600.

Douglas Benn
Medical Computer Systems, Inc.
8585 N. Stemmons, Suite 100
Dallas, Texas 75247

Equal Opportunity Employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

Explore These Opportunities

on the San Francisco Peninsula...

...with Control Data Corporation, a pace setter in the computer industry. We have immediate career opportunities for talented individuals in the following disciplines.

Project Leaders

If you have the ability to provide technical direction to programmer analysts, we want to talk with you. Several positions are currently available in our Systems Evaluation and Network Products Department. BS in Computer Science and 3 years' programming experience or equivalent are required.

Data Base

Management Development

Participate in the design, implementation and maintenance on a variety of data management projects, including new features in the data description language and the data base access product. A working knowledge of block structured languages is required. Familiarity with an assembly language is highly desirable.

Compiler Development

If you have knowledge of a compiler theory and construction and a working knowledge of assembly and higher level languages, we want to consider you for positions in our Common Code Generator, Common Library and BASIC and FORTRAN compiler projects.

Communications Software Development

A strong programming and software implementation background and experience in communication software will qualify you for programming positions within our Networks Development area.

Communications Software Field Support

Will provide technical and consulting support to customers worldwide on Communications Network software for CYBER 170. Tasks involve problem diagnosis, development and teaching of seminars, consulting to customers, technical writing and special project design-implementation. Requires communications and large systems experience. Excellent opportunity for both intermediate and senior level people.

Systems Evaluation

You will be involved in the performance analysis of compiler, data management and network products. Positions include performance test base development, test plan development and development of performance analysis tools for standard scientific software products.

Software

Technical Writers

Begin your career in technical writing, or allow us to make use of your experience in our technically challenging environment documenting state-of-the-art software for the world's leading large-scale computer systems. You will be involved in preparing user manuals supporting CDC's software product line, including ALGOL, COBOL, FORTRAN, PL-1 and data management languages. Ideal candidate will have BS degree in Computer Science with some writing experience, or a combination of equivalent skills/education.

Control Data offers a challenging and rewarding work environment and with us you will receive recognition and technical growth. We provide excellent compensation and comprehensive benefits, including dental and retirement plans. Qualified candidates are invited to send resumes, stating position of preference and salary requirements to Karen Hardy, Dept 50A, 215 Moffet Park Drive, Sunnyvale, CA 94086. (408) 734-7434.

**CD CONTROL DATA
CORPORATION**

An Affirmative Action Employer M/F

Writer/Editor

We have an opening for someone with proven writing skills and the ability to research and prepare long articles on computer equipment, personnel and trends.

You'll be working in a pleasant, busy, small company environment — and will enjoy excellent benefits, including profit sharing. We're located in a suburb next door to cosmopolitan Boston.

To apply send your resume or a detailed letter (no phone calls please) to E. Drake Lundell Jr., Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Computerworld is an equal opportunity employer m/f

COMPUTERWORLD



PROGRAMMERS/SYSTEMS ANALYSTS

SWEDABILITY

It's what we're looking for in our Programmers and Systems Analysts

Ambition and confidence. They're part of what we call Swedability. They help make us one of the most progressive divisions of Litton Industries, located in suburban Morris County, New Jersey, convenient to New York City.

Swedability represents the difference between just competence and excellence. We build it into all our Point-of-Sale systems. And we look for it in the people who work with us.

Right now, we need more Programmers/Systems Analysts who really know their business. We require people experienced in minicomputer Assembly language (NOVA a plus), data communication, POS applications; BS degree or equivalent.

If you have the trait we call Swedability, we'll arrange for you to meet more people like you.

Express your Swedability by rushing your resume in confidence to: Director of Professional Development, SWEDA INTERNATIONAL, INC., 34PB Maple Ave., Pine Brook, New Jersey 07058.

Equal Opportunity Employer M/F

SWEDA
Litton INTERNATIONAL, INC.



COME GROW WITH US AT COMTEN

Yes, COMTEN is enjoying dramatic growth within the telecommunications industry with major product offerings in the data communications and computer performance monitoring fields. Right now we need talented individuals in our St. Paul, Minnesota headquarters and at many of our 53 service points throughout the country.

Even if you aren't looking for a position now, COMTEN is worth the effort to investigate. We assure you of a stimulating environment in which to grow and be recognized.

Just some of the openings available include:

SYSTEMS PROGRAMMERS:

Enjoy the satisfaction of designing and developing operating system software for a distributive process environment. Multiple openings exist in the following product areas: front end communications systems, network processors, and performance measurement systems. At least 2 years experience in the design, development, test, and documentation of assembly language programs in a real time environment required.

PROJECT MANAGERS:

Responsible positions in Chicago and Detroit planning and controlling large scale data communications systems from the pre-sales effort through implementation. In addition, the incumbent will perform sales support activities including technical presentations and proposal preparation. We require management experience, skill in project control techniques and a broad systems background.

SYSTEMS ANALYSTS:

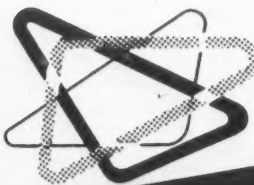
For the problem solver who thrives on a challenge. Gain maximum corporate visibility while enjoying the contact and variety of customer support and implementation, small project development, and situation/project management. Candidates should possess knowledge of large scale IBM communications systems and 2-3 years programming in BAL, JCL, and OS utilities.

MARKETING REPRESENTATIVES:

Opportunities for professional sales reps with at least 5 years experience in data communications, IBM 360/370 and emulation knowledge. Excellent territories, salary, commission and bonus plan.

In addition to excellent opportunities for career advancement, you will enjoy our excellent salary/benefit package. Send resume including salary requirements and geographic preference to Jane Christianson.

COMTEN, INC.
1950 West County Road B2
St. Paul, Minnesota 55113



COMTEN

We Are An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS SOFTWARE PROGRAMMERS

The Commercial Division of University Computing Company, an internationally recognized leader in proprietary systems software for the IBM market place, is currently accepting applications for the following positions at the company's home office in Dallas:

SOFTWARE ANALYST (UCC ONE). Will provide program development, maintenance, coding, and customer support for UCC's Tape Management System. Requires IBM 370, OS internals, ALC/COBOL, and 2 years systems programming experience.

PROGRAMMER ANALYST (UCC TWO). Will design and code enhancement for DUO, UCC's DOS under OS product. Additional responsibilities include customer support and documentation of the product. Requires 360/370; ALC; DOS/OS/VS/MVS; and 2 years DOS and/or OS Systems programming experience.

LEAD SOFTWARE ANALYST (UCC TEN). Will participate in the design and implementation of new features and extensions to UCC's IMS Data Dictionary. Will also provide customer support. Requires 3-5 years design & programming experience including 2-3 years IMS experience with exposure to IMS internals & SYSGEN'S.

MARKETING SUPPORT REPRESENTATIVE (UCC THREE and SIX). Will provide technical sales support and training for UCC's Disk Management System and PDS Space Manager. Requires 2 years systems programming experience, ALC, OS/VS, and excellent interpersonal skills. Career path from this position will lead to sales.

All of the positions, which are permanently located in Dallas, offer excellent salaries and benefits. Advancement opportunities in the fastest-growing division of UCC are excellent.

For confidential consideration, call or send a resume to: Henry Oliver, University Computing Company, P.O. Box 47911, Dallas, TX 75247. (214) 688-7178.

UCC
UNIVERSITY COMPUTING COMPANY

An Equal Opportunity Employer

PROGRAMMER/ANALYSTS

A Good Year For Us
A Better One For You?

DASD Corporation provides data processing services in Atlanta, Cherry Hill, N.J., Chicago, Dallas, Des Moines, Hartford, Houston, Los Angeles, Milwaukee, Minneapolis-St. Paul, Omaha, Orlando, Philadelphia, San Francisco, and Seattle.

WE OFFER THE FOLLOWING:

- Challenging opportunity
- Personal recognition
- Current state of the art
- Above average earnings
- Chance to develop potential.

WE NEED AT LEAST 3 YRS. EXPERIENCE IN ANY OF THE FOLLOWING:

- COBOL, PL/1, ALC, RPGII
- Structured programming technique.
- IMS, TOTAL, other Data Bases
- OS/DOS

Please call or send your resume to:

DASD
CORPORATION

8705 N. Port Washington Rd.
Suite 301
Milwaukee, WI 53217

(414) 351-2600

An Equal Opportunity Employer M/F

PROGRAMMER SYSTEMS ANALYST

Excellent opportunity for an individual with ALC and COBOL experience. Must also be familiar with JCL. Small shop in large Indianapolis supermarket chain. IBM 370, DOS/VS environment. We offer excellent salary and benefit program, and opportunity for personal and professional growth. Please submit resume, including salary history, in confidence to:

Bill Babcock, Personnel Director
333 South Franklin Road
Indianapolis, IN 46219

Standard Supermarkets
Div. of National Tea Co.

Equal Opportunity Employer

BURROUGHS PROFESSIONALS

Currently seeking programmers and analysts to fill immediate openings. If you are interested in exploring new opportunities, send your resume in confidence to:



SEARCH E.D.P., INC.
P.O. Box 8032
Cincinnati, OH 45208

NEW ENGLAND NEW YORK STATE

We specialize in EDP positions. Multiple openings. Career positions with both large and small companies. Exclusive clients. Sal. \$14-29,000.

Insure your future. INVESTIGATE IN CONFIDENCE. Call or send resume.

Richard P. Rita
Personnel System
24 Aviation Road, Albany,
New York 12205 (518) 458-7340

Computer Science Faculty

Hartford State Technical College, a two-year coeducational college of technology, is seeking two full-time persons to teach computer science courses in its math/science and business/accounting options. Minimum requirements: bachelor's (master's preferred) in computer science or related discipline and three years of recent relevant industrial experience. Rank and salary commensurate with qualifications. Starting date, September 1, 1978. Please submit letter of application and detailed resume by July 20, 1978 to Dr. Ralph L. Boyers, Dean of Instruction, Hartford, CT 06106.

EEO/AA Employer

DATA COMMUNICATIONS ANALYST PROGRAMMER

Experienced on-line Analyst/Programmer for development and management of on-line networks. Requirements: 3 years on-line experience, network design, and working knowledge of CICS and CIF. Must know COBOL and BAL. We offer excellent benefits. Salary commensurate with experience in on-line systems. Inquires to:

Human Resources Div.
FIRST NATIONAL BANK
IN LITTLE ROCK

P.O. Box 1471
Little Rock, AR 72203
(501) 371-7177

an equal opportunity employer M/F

PROGRAMMERS

PHILADELPHIA NATURALLY

For a relaxed life style ... For the income your talent deserves.

Progressive PHILA area mfr has IMMEDIATE NEED for 7 seasoned PROGRAMMERS, PROG/ANAL w/3 yrs lge scale IBM COBOL exp. from MFG environ. Exposure to T/P, CICS or TOTAL DATA BASE highly pf'd. HIGH PERFORMANCE could earn splendid mgmt opportunities within co. Depending upon exp; salary to \$25,000.

Please call for immed intv appt or forward resume to:

ROBERT HALF
PERSONNEL AGENCIES



2 Penn Ctr., Suite 706
Philadelphia, PA 19102
(215) 568-4580

DATA PROCESSING MANAGER

Immediate opening. Data processing manager for national tool distributing company. Should be familiar with all aspects of operating and managing a PDP 11/70 using RSTS/E operating system. Experience with basic plus II and RMS 11/K helpful. Degree, experience in data processing management and business systems essential. Salary commensurate with experience. Excellent fringe benefits. Tempe location. Equal opportunity employer M/F. Send resume to Personnel Coordinator, P.O. Box 22030, Tempe, Arizona 85282.

NEW BUSINESS DEVELOPMENT AND PLANT MANAGER OPPORTUNITIES

Major Eastern Fortune 500 Communication & Instrumentation Repair Organization has career growth opportunities for profit & loss new business development and plant managers to lead business growth in:

- Equipment Rental
- Communication Service
- Measurement Service
- Instrument Calibration

We are seeking individuals with the following qualifications:

- Engineering Degree Computer Science, Electronics or Computer Science (MBA or Advanced Financial Degree preferred)

Measurement Service requires MS degree in electrical/mechanical with PhD preferred

- A minimum of ten years experience in the communication or measurement and diagnostic field
- Entrepreneurial profit and loss skills
- Willingness to travel

We offer an excellent salary and benefit package. Please send resume and salary history in complete confidence to: CW Box 1602, 797 Washington St., Newton, MA. 02160.

An equal opportunity Employer M/F

MANUFACTURING PROJECT MANAGER

The Appleton Electric Company of Chicago needs you if:

- you are experienced in manufacturing systems
- you are interested in managing a project team of 6 programmers/analysts
- have new ideas to aid in the implementation of a new system on new hardware
- are interested in getting reimbursed well, including an overtime compensation plan.

Interested?

Pick up the phone and call:
Dick Baschleben

APPLETON

ELECTRIC COMPANY

1701 W. Wellington Ave.
Chicago, IL 60657
(312) 327-7200

Equal Opportunity Employer M/F

MIAMI, FLORIDA SAVINGS & LOAN 2 PROGRAMMER/ANALYSTS

We are looking for the 2 most capable programmer analysts - assembly language essential - Savings experience a plus.

We are a rapidly growing 800MM S&L with a progressive and involved management team. We are extremely results oriented - our philosophy is to hire quality rather than quantity. We offer a people oriented and flexible working environment.

We consider these to be exceptional opportunities. You will get as much responsibility as you can handle.

We are currently converting from a serviced system to an inhouse MCR Criterion system with state of the art communications equipment.

Salary for the senior person will be between \$20-\$26,000, for the second person \$15-\$19,000.

Write including salary history to:

DP MANAGER
1790 Biscayne Blvd., Miami, Fla. 33132
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

With Every Heartbeat...

Medtronic biomedical technology is improving your life...

...and within the high technology areas of data processing, we're offering challenging assignments in unique and exciting business applications. Here, you'll find real opportunity to fully exercise your talents and skills in a progressive environment utilizing:

- TOTAL Data Base Management System
- On-Line Programming and Applications
- Conversion to OS

Our current openings require a professional background including IBM 370, DOS/VS, and OS/VS1 for the following positions:

- System Analyst
- Computer Design Specialist
- Sr. Software Analyst
- Sr. Programmer

Now is the time to consider our top compensation, competitive benefits package, and the chance for advancement. For immediate consideration please submit comprehensive resume with salary requirements to:

Betty Wilson (612) 574-3744



Medtronic, Inc.
3055 Old Highway Eight
P.O. Box 1453
Minneapolis, MN 55440 USA

Equal Opportunity Employer M/F

COLORADO!

PROGRAMMER/ANALYSTS — Large scale IMS applications development. Structured design, corporate-level implementation.
SYSTEMS ANALYSTS — Design specification and user documentation for banking and manufacturing systems.

PROGRAMMERS-IBM System III COBOL and RPG. CCP. IPICS experience highly desirable.
SOFTWARE SPECIALISTS — IBM DOS/VS SYSGEN and support.

VP/SALES — Quota performer with sales management experience. Requires familiarity with banking industry, major commitment experience.

Reply in confidence to Mr. Peeper, NELSON, COULSON, AND ASSOCIATES, INC., Consulting Engineers, Suite 507, 333 W. Hampden Ave., Englewood, Colorado 80110. EOE M/F.

SOFTWARE SPECIALISTS MISSION POSSIBLE!

The prime mission of Sperry Univac's Technical Services Division is to provide solid and responsive support to computer systems users.

Systems design, applications analysis, programming, and operations; Technical Services does it all — backed by Sperry Univac, a world leader in the design, manufacture, and application of state-of-the-art computer systems.

Join forces with the Technical Services Division in any of the following locations and give your career and talents the opportunities they deserve!

Dahlgren, Virginia
Lexington Park, Maryland
Newport, Rhode Island

Assignments involve Real Time Tactical Applications in the following areas:

- ASW
- Weapons Systems Fire Control
- Shipboard Command and Control Systems

Requirements for these positions are:

- Univac military computers of 16-Bit mini's
- Real Time Assembly language
- Bachelor's Degree or equivalent experience

More than possible... it's probable that Sperry Univac can offer you the best combination of salary, benefits, and growth opportunities in the industry. Make it your mission to find out how better!

CALL JOHN DePRIMA
COLLECT AT:
(703) 558-4486

Or Rush Resume To:
1901 N. Moore St. - 11th Floor
Arlington, VA 22209
Attn: J. DePrima

SPERRY UNIVAC
TECHNICAL SERVICES DIVISION

An Equal Opportunity Employer M/F

EDP OPPORTUNITIES

Methods & procedures forms control-of svces \$50K
SYSTEMS Engr-NYC Calif. LA-communications \$25-27K
SOFTWARE Design OS or DOS-hvy internal. \$25-28K
SOFTWARE Support-50% travel U.S. Communications \$25-28K
WALL St DOS or OS Cobol or BAL I&S, margin, commissions, stock record etc. \$27-31K
PROJECT Mgr-transportation industry, OS. \$25-31K
PERFORMANCE Measurement Boole & Babbage-Capex. \$27-31K
EDP Audit-OS DOS Cobol RPG \$19-25K
PDP Audit8-OS DOS Cobol RPG \$19-25K
PDP RSX 11 M/RSTS ALP software \$25-29K
SYSTEMS Mgmt Credit card systems developmnt. To \$37K
INTERDATA Real time systems-Fortran/ALP \$27-33K

Bill Borrelli (212) 349-3610
William Harris Assoc
150 Broadway agency NY 10038

SYSTEMS ANALYST

A Fortune listed company, the biggest in its industry, is looking for a team leader for its Teleprocessing group. Should know IMS/DC or CICS, Structured Programming, Cobol and be prepared to advance. IBM 370/168 MVS 3033 on order. Salary \$25,000+. Call or write: (305) 358-9280.

Michael Rottblatt
Ott, Hertzner,
Ott & Assoc.
1401 Brickell Ave., Suite 603
Miami, FL 33131

Computer/Information Sciences

Senior faculty position: Professor or Associate Professor to teach undergraduate information/computer sciences courses. Ph.D. required with significant professional and/or baccalaureate level educational experience in Computer/Information Sciences. Rank and salary commensurate with qualifications: Professor: \$21,434 - \$24,496; Associate Professor: \$17,632 - \$20,153. Reply with resume by July 7, 1978 to Dean Theodore Marton, Box 7809, Stockton State College, Pomona, N.J. 08240. Affirmative Action/Equal Opportunity Employer.

DIGITAL SIMULATION HARDWARE & SOFTWARE ENGINEERS & TECHNICIANS

Immediate and upcoming career opportunities in support of military and commercial high technology digital simulation projects. Excellent salary and benefits for entry level through senior level personnel with BS or higher degree and appropriate experience in some of the following:

- DIGITAL HARDWARE DESIGN & FAB (Microprocessor applications and MIL-STD-1553 background)
- SYSTEM SOFTWARE (Detailed expertise in DECsystem-10 TOPS-10 monitor)
- APPLICATION SOFTWARE (Fortran and assembly program development utilizing DECsystem-10 and PDP-11 series computers)
- SYSTEMS ANALYSIS (requirements analysis and design specifications for large-scale hardware/software systems and modifications to existing systems)

Avionics hardware and software experience desirable. For confidential consideration, please call or forward resume to:

H. HUDSON
SIMUTECH

4124 Linden Ave. Suite 200
Dayton, Ohio 45432
(513) 252-5623

An Equal Opportunity Employer M/F/H

COMPUTER

Programmer/Analyst

Position available at NSI's Research Triangle Park, N.C. facility for an individual with B.S. Computer Science or EE. Two years experience with DEC, PDP 11-M operating system including direct hands on manipulations to MACROS and drivers. Experience in the following: PDP 11/34 and several 11/03 microcomputer satellites (DECNET); designing interfaces with chemical analysis devices; Analytical Chemistry lab automation; leadership and graphics. Will provide software programming and hardware expertise for PDP 11/34 minicomputer. Read existing applications and design and implement new applications.

Interested applicants send resume including salary history and present salary requirement in confidence to:

NORTHROP
SERVICES, INC.
P.O. Box 12313
Research Triangle Pk., N.C. 27709
Equal Opportunity Employer M/F

SYSTEMS PROFESSIONALS

NATIONWIDE SERVICE

Mgr Sys & Prog To \$35K+
Midwest Div. Consmr Mfg
370/OS growth oppty
Mgr Bus Sys To \$29K
Strong mgmt exp, mfg syst
dev. multi plant div HQ
Mgr Sys & Prog To \$30K
Pennsylvania-Strong Mgt
Skills-Excellent Track Rec-
ord Req'd.



O-R-T-U-N-E
DATA
DIV FORTUNE
PERSONNEL AGENCY
505 5th Av. NYC 10017
(212) 682-8600
Company Inquiries Invited

DP PROFESSIONALS

System Software	IMS DB/DC Internals	High 20's
System Software	CICS Internals	High 20's
Banking	TP Development ALC/CICS	16-19,500
Banking	Loan Systems COBOL/CICS	18-20,000
Consulting	COBOL/CICS	18-24,000
Insurance	Life or P&C	16-20,000
Data Base Analyst	IMS PSB DBD	18-22,000

Dunhill of Forth Worth, Personnel Consultants
901 Ridglea Bank Bldg., Fort Worth TX 76116
(817) 732-8191

SYSTEMS ANALYST TECHNICAL APPLICATIONS

Worldwide leader in the offshore engineering and construction industry has positions available in its Data Processing Development Division.

Responsibilities include the design & development of large-scale, engineering-oriented data processing systems for use in the offshore industry.

The positions require experience in technical applications using PL/I or Fortran, with OS/VS, JCL and TSO desirable. BS Degree or above in math, physics, engineering, or computer science is required.

Positions offer excellent starting salary, fringe benefits & opportunity. Submit resume, including salary history, in complete confidence to: Lou Sannino.

J. Ray McDermott & Co., Inc.

P.O. Box 60035
New Orleans, LA 70160
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMER

We are looking for a Systems Programmer to work on a 3031 at KMS FUSION, INC., a company in Ann Arbor, Michigan, doing laser fusion research.

The Computing Department is small and the work will be varied and challenging. You will be responsible for the computer operations, and will also maintain MVS. We are looking for someone with at least 3 to 5 years experience as a Systems Programmer on OS or OS/VS - This is not an entry level position.

Applicant should be familiar with Assembler, FORTRAN, COBOL, OS-JCL, and utilities, and should have performed a SYSGEN. You will also be working with CINCOM's "TOTAL", Speakeasy, TCAM/TSO, and graphics applications.

KMS FUSION offers excellent fringe benefits in a suburban university atmosphere. Starting salary is competitive and based on experience and ability.

Applicant must be a U.S. citizen and be able to obtain a security clearance.

Please send resume and recent salary history to:

kms fusion, inc.

Director of Personnel

Code - SP

Box 1567

Ann Arbor, MI 48106

We are an Equal Opportunity Employer M/F

PROGRAMMER: NCR

Expanding Modern Medical Center has position available for person with Century NEAT/3 knowledge and Payroll System experience. Other hospital exposure a plus. Central New Jersey suburbs, near shore and major highways. Excellent benefits. Salary based on experience and ability. Send resume to J.C. Dunnigan, Personnel Office, J.F.K. Medical Center, James St., Edison, NJ 08817.

PHILADELPHIA

DIRECTOR COMPUTER SERVICES To \$35,000

Cost conscious BUSINESS SYS MGMT expert for PHILA area INSURANCE GIANT. Coordinate activities of lge dept. servicing East Coast branch offices. Will develop policy & procedures insuring productive INTERACTIVE MGMT SYSTEMS. Effective communicator, current in the state of the art, will find challenging career spot.

For immed intv appt; please call or forward resume to:

ROBERT HALF

PERSONNEL AGENCIES

2 Penn Ctr., Suite 706
Philadelphia, PA 19102
(215) 568-4580

APPLICATIONS

PROGRAMMER/ANALYST

A well-known food processor located in the greater Los Angeles area needs an experienced, highly motivated Programmer/Analyst with business applications background. Position requires a minimum of 4 years experience in programming and analysis in business application in a manufacturing environment using RPG II. Knowledge of COBOL, DYL 260 and IBM Bill Processor desirable. This is an exceptional opportunity for the right person.

We offer a good starting salary and regular salary reviews. All of our benefits are entirely company paid including group insurance, long-term disability and profit sharing. Call personnel for an interview appointment or send resume to:

KERN FOODS, INC.

P.O. Box 1207
City of Industry, CA 91749
(213) 962-5111 Ext. 281
Equal Opportunity Employer M/F

Systems and Programming

Positions Available

Direct mail experience absolutely necessary. Excellent salaries and fringe benefits. Call Phil Sheats, PSA, Inc., at (301) 269-1424.

ASSISTANT DIRECTOR COMPUTER CENTER

Master's Degree, network management and accounting and business management experience required. Doctor's Degree desired. 12-month position. Salary range \$18,300 to \$26,500. Liberal benefits. Ocean County College located on the Jersey Shore midway between N.Y.C. and Philadelphia, is a two-year community college with a student population of 5,000. Computer Center employs 40 persons; has 107 ports and terminals, and uses Univac 9060 computer - 1.5 Meg. Servicing colleges, school districts, and libraries. Resumes should indicate publications and specific prior experience. Submit resume to Director, Computer Center, Ocean County College, Toms River, NJ 08753, by July 14, 1978. An Equal Opportunity Employer.

Systems Analysts Systems Programmers

Be in the vanguard of
communications software
development at NCR.

Join a highly strategic NCR division that — among other things — is at the heart of NCR's whole future in Distributed Network Architecture. As a software development professional at NCR Communication Systems Division in Columbia, S.C., you'll be working on the very latest in multiprocessor software for microprocessor-based systems.

The communications projects you'll work on and the products you'll design will lead to direct involvement with 1980's concepts, and with state-of-the-art development in:

- Bit-Oriented Link Protocols
- Packet Switching
- End-to-end Protocols
- Internodal Routing Algorithms
- Network Supervision
- Distributed Processing

The key professionals we're seeking for our expanding, and strongly software-oriented communications group will have had solid backgrounds in communications and/or systems software. More specifically, we require 3 or more years of experience in one of the following: Assembly Level Programming; Operating System Design; Communications Link Drivers (asynch, synch, SDLC); Front End Processor Software; Terminal Controller Software; Data Network Design.

For a high-level review of your qualifications, and a prompt briefing on the exceptional career opportunities and lifestyle you can enjoy at NCR/Columbia, send resume and salary history to: Mr. Kenneth Uhlig, NCR Corporation, Engineering & Manufacturing, 3325 Platt Spring Road, West Columbia, South Carolina 29169.

NCR

Complete Computer Systems

An equal opportunity employer

Data Communications DESIGN ENGINEERS

• MODEMS • MULTIPLEXORS

Analog/digital circuits, filters, LSI, MOS, networks, microprocessors. Rapid growth of leading manufacturer has created openings at all levels. This dynamic company is located in an attractive and accessible town.

Fees paid. For immediate company consideration rush resume to Design Engineering Dept.

PERSONNEL RESOURCES
INTERNATIONAL, INC. AGENCY
TELECOMMUNICATIONS PLACEMENT
342 Madison Ave., N.Y. 10017
Suite 1234 (212) 682-2030



Our computers help make the perfect fit

JOB SEEKERS

JOB OPENINGS

CYBERSEARCH® is the computerized technical/professional employment service for recruiters and job seekers. Here's why it works much better than conventional matching of jobs with applicants.

Faster. Our computers can make a local or nationwide search for applicants in minutes.

More accurate. Better matching eliminates wasted interviews.

More complete. Information readily available from the data bank. Can't be misfiled or out-of-files.

Confidential. Individual and company names are coded.

EMPLOYERS, call nearest Cybersearch office for immediate service.

Ask for the Data Processing Department.

JOB SEEKERS, please send resumes.

CYBERSEARCH

The COMPUTERIZED Employment Service

CHICAGO, IL 214 North Michigan 60601 312-454-8490	IRVINE, CA 17744 Sky Park Boulevard 92714 714-754-7701	PHILADELPHIA, PA Two Salacynsky Plaza 19004 215-667-2400
DALLAS, TX 8385 Stemmons Freeway 75247 214-688-5810	LOS ANGELES, CA 8616 La Tijera Boulevard 90045 213-642-2462	SAN JOSE, CA 2025 Gateway Place 95110 408-866-3186
HOUSTON, TX 2000 West Loop South 77027 713-965-6666	MINNEAPOLIS, MN 6800 France Ave. South 55435 612-830-6650	

CONTROL DATA CYBERSEARCH INC.



A subsidiary of
CONTROL DATA CORPORATION

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER/ ANALYSTS



WOULD YOU LIKE TO DETERMINE YOUR FUTURE?

Your Interview With CSC System Sciences Division May Establish Your Career Path

It isn't enough to offer challenge. At Computer Sciences Corporation we offer our more than 10,000 employees the chance to contribute to projects with rewarding consequences. Your ambition to grow and develop may be realized in this environment.

The System Sciences Division develops highly complicated projects using scientific programming and analysis. Our projects could be spacecraft simulation and control, or other similar tasks. We invite you to inquire immediately about our many growth opportunities.

- 360/OS System Generation and Maintenance
- Distributive Network Systems
- Data Base Management
- Real-Time Satellite Command/Communication Systems
- Real-Time Operating Systems
- Simulation/Modeling
- Microprocessor and Mini-Computer Software Design and Development

These positions are in support of our Mission Support, Scientific and Applications and Goddard Real-Time Systems Projects with the NASA Goddard Space Flight Center.

CSC offers competitive salaries and a complete benefits package. For further information, please send resume or call:

Staffing Department
Collect: (301) 589-1545 Toll Free: 800-638-0842

COMPUTER SCIENCES CORPORATION
System Sciences Division
8728 Colesville Road
Silver Spring, MD 20910
Major Offices and Facilities
throughout the World
Equal Opportunity Employer M/F

Energy Management Systems Programmer Operator

Challenging new position open in sunny Albuquerque to project manage a dual EMS Computer System to be operational in 1979. Responsibilities include approval of manufacturer developed software and hardware documents consistent with contractual guidelines and project objectives.

Upon completion of system acceptance testing and field integration, the Programmer will develop new power applications programs and other programming techniques, while being responsible for on-going software maintenance.

Applicant should possess a background in, or knowledge of, Electric Utility Power Operation and be experienced in Assembly, Fortran and other computer languages.

If interested, please send resume, salary history and reference to: Plains Electric Generation and Transmission Cooperative, Inc. 2401 Aztec Rd., NE, Albuquerque, NM 87107.

**Plains Electric
Generation & Transmission
Cooperative, Inc.**

an equal opportunity employer m/f

Positions now open in Administrative Data Processing for programmer and senior programmer. Degree and/or equivalent experience required. Environment includes IBM 370/138 using OS/VS1, PL1, and CICS. Please send resume, including salary history to:

**Personnel Office
Northern Michigan
University
Marquette, MI 49855
An Affirmative Action
Equal Opportunity Employer**

DATA PROCESSING PROFESSIONALS

Atlantic States is a national recruiting firm searching for EDP specialists at all experience levels and with diverse systems backgrounds. Many openings nationwide. Fees paid. For selective handling, WITHOUT PRESSURE, mail your resume to: ATLANTIC STATES PERSONNEL, P.O. Box 9928, Savannah, GA 31402.

Software/Hardware Professionals

Powerful growth prospects... full-range of NCR mainframes... San Diego living!

Want the stimulation inherent in developing a brand new generation of small to large total computer systems? Want exceptional visibility in one of the biggest, most far-reaching pioneering efforts ever undertaken by a major computer manufacturer? Want southern California living at its best? Join us!

At NCR's award-winning facilities in San Diego you'll have a chance to "do it all". We're developing new systems architecture, and integrating controllers, memories and software for the most powerful family of processors we've ever built. You'll be breaking new ground. You'll have wide open career paths, and all the growing room you'll ever need.

And you'll have the San Diego lifestyle. Seventy miles of beaches from San Clemente to the Mexico border. One of California's most sophisticated cities. Sixty-five golf courses; major colleges and universities; and showcase computer facilities on a 114-acre site north of San Diego in Rancho Bernardo.

It all adds up to powerful reasons why—if you have experience in one or more of the following areas—you should contact us at once.

SOFTWARE PROGRAMMER ANALYSTS

- Distributed Network Architecture, Transaction Processing, Interactive Processing
- Operating Systems and Compiler Development, Data Base
- Firmware, Diagnostic Programming
- Performance Measurement and Analysis

NCR

Complete Computer Systems

HARDWARE ENGINEERS

- Design Automation, Memory Devices, Logic Design, Test Systems
- Components (Semiconductors), Product (Electro-mechanical)
- I/O Subsystems, Integration, Configuration
- MICR/OCR/OMR Engineering

Send resume and salary history to:
Professional Placement Department,
Engineering and Manufacturing,
NCR Corporation, 16550 W. Bernardo
Drive, San Diego, CA 92127.

Meet our
technical
representatives
in these cities. To
arrange a convenient
interview in advance, call
George Rice (collect) at
(714) 485-2153.

Dallas	July 7 & 8
Houston	July 9 & 10
Milwaukee	July 14 & 15
Minneapolis	July 16 & 17
Philadelphia	July 21 & 22
Washington, DC	July 23 & 24

Vacationing near us this summer?
A brief visit to NCR can be an eye opener. So if you're going to be in our area, plan to stop by. Contact us in advance for a technical interview.

An equal opportunity employer

SUN BELT COMPANY NEEDS A 370 SYSTEM PROGRAMMER

Bancology Inc. of El Paso, Texas has an immediate need for a professional with at least 2 to 4 years experience in Operating Systems generation and internals for DOS/VS or OS/VS. You must have a strong background of System 370 architecture and assembler language. A knowledge of VM is a definite plus.

We are looking for a person with a positive work attitude to be associated with a growing finance industry related firm. Our aggressive shop offers a highly professional work environment. We guarantee your efforts will be recognized and rewarded.

Bancology provides technical growth in a "ground up" on-line development atmosphere as well as the utilization of advanced operating systems philosophy.

Our parent organization, PanNational Group, Inc., provides all the benefits you would expect, and then some: good salary, hospitalization (including dental care), life insurance, long term disability, accident insurance, vacation, retirement plan, thrift plans, education plans and a congenial place to work.

You will find in El Paso, Texas the advantages of easy southwestern living. Temperate year-round climate and friendly people are our trademark as are excellent public and private schools and universities. Wholesome, family style living makes our area the "best" in the United States. Leave the hot humid summers and cold snowy winters and join us in El Paso.

Send resume, including salary history to:

**S.D. Bulger
Personnel Director
P.O. Box 5591
El Paso, Texas 79955**

An Equal Opportunity Employer (M/F)

position announcements

position announcements

position announcements

position announcements

position announcements

EDP CAREER OPPORTUNITY

A bank processing firm, the Financial Computer Center of Eastern New York, Inc., located in suburban Schenectady, currently has a unique position available for a person who has NEAT/3 and on-line programming experience, preferably with CIF/CIRF FROCD.

You could be the person we are seeking if you have an EDP background and communicate effectively. This is a liaison position in our Corporate MIS Group and involves trouble-shooting in supporting our divisions and subsidiaries. Light travel is required.

FCCENY offers an excellent company paid benefits program, including pension plan. For further information, please call:

John Saglimbeni
(518) 372-4741 or 372-4741
**FINANCIAL COMPUTER CENTER
OF EASTERN NEW YORK, INC.**
650 Franklin Street
Schenectady, N.Y. 12305
An equal opportunity employer M/F

SYSTEM PROGRAMMERS

PENN STATE'S SYSTEM/370 Model 168, providing research and instructional services to our large academic community, is scheduled to be upgraded to a 3033 Processor in August 1978. This computer is the hub of a network supporting 40 remote batch installations plus conversational RJE, time-sharing, and graphics terminals. High performance (over 18,000 jobs in a peak day) has been achieved by modifications and development of systems programs with emphasis on manageability and system throughput.

SYSTEM PROGRAMMERS are needed to participate in our conversion from MVT/HASP to MVS/JES2, to help us establish an effective measurement and evaluation program, to install and support enhanced interactive services, and to develop other sub-systems.

APPLICANTS must have a degree in Computer Science or related field and must have demonstrated fluency in S/370 assembler language and a sound knowledge of operating system organization and principles. Also desirable are experience with HASP or JES2 internals, experience with interactive systems, and advanced degree. Salary and responsibilities will be commensurate with education and experience. Send resume, including education, professional experience, and salary history, to Dr. Donald T. Laird, Director, Computation Center, 229 Computer Bldg., University Park, PA 16802.

THE PENNSYLVANIA STATE UNIVERSITY
An Affirmative Action/Equal Opportunity Employer

Programmers-Analysts Maximize your opportunities...

...take advantage of the most individualized job search available in the D.P. industry today. You pay absolutely NO fee for our service. We search out the best opportunities nationwide to fit your earnings & growth potential with respect to your location requirements. In confidence, send us your resume with present salary & geographic preference. Let us maximize your opportunities.

SEARCH E.D.P., INC. 3152 Linwood Ave. Cinti. Oh. 45208

COMPUTER SERVICES BRANCH MANAGER

If you are a person that can "Make it Happen" in our industry, we would like to talk to you.

We are a dynamic, growing remote computer services company with branch management opportunities in new and established offices from coast to coast.

We offer the opportunity to manage your own office and participate in the exciting growth pattern of our company. Your compensation will be a combination of salary and incentives that form a very attractive earnings package.

Please drop a brief resume and earnings history to Computerworld Box 1600, 797 Washington St., Newton, MA. 02160.

All replies are considered confidential. We are an equal opportunity employer.

MGR. SYSTEMS PLANNING

Conn. div. of lge. corp. seeks indiv. to provide broad IBM research & development direction in use of "state-of-the-art" technology. Scope of resp. depends on level of exp. Salary to mid-\$30's. Contact Stan Durbas. (Fee Paid)

ROBERT HALF PERSONNEL AGENCIES

111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

FIELD SERVICE ENGINEERS

Join our rapidly growing field service company. We offer unlimited opportunity, a full benefit package, top salaries and more.

If you are ready for a company where your efforts will be recognized, appreciated and rewarded, pick up the phone and dial toll free 800-327-4581 now.

SYSTEC, INC.
101 Wymore Rd.
Altamere Springs, FL 32701

COMPUTER PROGRAMMER

We are looking for a Computer Programmer with 1-2 years experience in BAL and COBOL. Finance and OS experience would be helpful. Salary will be commensurate with experience. Send resume to:

Old National Bank
Human Resources Dept.
P.O. Box 3588 TA
Spokane, WA 99220
Equal Opportunity Employer

SAN FRANCISCO DP Trainer Positions Bank of America Hqtrs.

In-House programming instructors needed for the following areas: COBOL, OS-370, ALC, STRUCTURED PROGRAMMING, DESIGN and ANALYSIS. Salary commensurate with experience. Department #3411-Staff Development, 1455 Market St., San Francisco, CA 94137. *Equal Opportunity Employer.*

BANK OF AMERICA

FACULTY POSITION

Instructor or assistant professor teaching data processing, business information systems, COBOL, and RPG beginning August 21, 1978. Masters degree necessary. Send resume, transcripts and three letters of recommendation immediately to Dr. Robert A. Dager, Head, Division of Business, Northeast Missouri State University, Kirksville, Missouri 63501. *An equal opportunity/affirmative action employer.*

SENIOR SYSTEMS ANALYST:

Individual will be responsible for co-ordinating educational software used for statewide administrative and instructional applications. Experience in a large scale IBM 370/vm environment is important. Knowledge of data base design and implementation is highly desirable. Salary is based on experience. Submit resume to: Personnel, Department of Public Instruction, Grimes Building, Des Moines, Iowa 50319 "An Equal Opportunity Employer"

COMPUTER SCIENCE ACCOUNTING INSTRUCTOR

Masters Degree. Two years community college teaching experience. Application Deadline is July 14, 1978. Contact: Personnel Office, Joliet Junior College, 1216 Houbolt Ave., Joliet, Ill. 60436. (815) 729-9020. Ext. 266. *Affirmative Action/Equal Opportunity Employer.*

TELEPROCESSING SPECIALIST

Nationwide steel distributor has opening for individual with proven track record in teleprocessing. We operate in a DOS/VS 148 environment, running BTAM and CICS.

Require candidates with systems programming and remote 3270 experience, and a thorough understanding of protocols and data network structures.

Successful applicant will have technical, PLUS oral and written communications skills to interface with vendors and contribute toward MIS Department long-range growth goals.

Excellent fringe benefits and salary commensurate with experience. Send resume, including current salary, to:

FOSTER

DD. Bagley

415 Holiday Drive
Pittsburgh, Pa. 15220

We Are An Equal Opportunity Employer M/F

Honeywell

**SYSTEMS SPECIALISTS
6600 GCOS/GRTS/NPS**

Provide System Support to our Honeywell Customer Base, working for Field Engineering Division, out of St. Louis, Missouri. Candidates must have 3-5 years experience with GCOS, Communications and mini computers. Future assignment will include involvement in networking using the Honeywell Level 6 Mini.

Send Resume To:
Honeywell, Inc.
2055 Craigshire Drive
St. Louis, Missouri 63141
Attn: Jim Mathis

**THE
SEARCH
IS ON**

Honeywell

ANALYST/ PROGRAMMER

M.I.S. International, Inc., an international computer systems integration company, needs specialized professionals for Michigan, Ohio and Indiana branches.

- Business system analyst/programmers with experience in COBOL, PL/1, IMS, DMS, IDS.
- Real time analyst/programmers with experience on micro/mini computers.
- Engineering analyst/programmers with time sharing experience.

Experienced men and women interested in furthering their career should consider M.I.S.'s top salary structure, stable employment environment, fully paid fringe benefits, educational opportunity and relocation allowances. You are invited to call or send your resume to Mr. Gene Bryant.



**M.I.S.
INTERNATIONAL, INC.**
31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

SYSTEMS ANALYST

Tropicana Products, world's largest producer of chilled orange juice, has an immediate requirement for an individual with a strong background in systems analysis, specifications and design. In addition to a degree in business or accounting, experience should include minimum of 5 years experience in Burroughs large systems including DMS-II and preparation of user requirement specifications.

The individual we are seeking will have a combination of technical and business skills, coupled with maturity and sound judgment. These skills should encompass the ability to provide an effective link between the user and data processing.

Send resume with salary history in confidence to:

TROPICANA PRODUCTS, INC.

P.O. BOX 338
Bradenton, FL 33506
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER ANALYST

The Power Authority of the State of New York is the largest non-federal public utility in the nation. In less than two decades the Authority has increased its generating capacity from 800 MW to 6,700 MW.

This tremendous growth has created a career position for a Computer Analyst. The ideal candidate will possess a B.S. degree in Computer Science or a related field and have at least three years experience in advanced Fortran and some experience in Assembler language and computer to computer communication. This individual will be responsible for supervising the work of several programmers who will be creating application and system software for a real-time digital computer system to be installed in a new energy control center. This position is located at the Authority's Niagara project and will require relocation to central New York in approximately two years.

This position offers an excellent starting salary, exceptional company paid benefits and future advancement potential.

For consideration, please submit a resume with salary history list to: Mr. E.F. Bridler

POWER AUTHORITY OF THE STATE OF NEW YORK

P.O. Box 277, Niagara Falls, N.Y. 14302

Equal Opportunity Employer M/F

CHIEF OF DATA PROCESSING

\$32,019 - \$37,915 Net of Tax

International Organization with Headquarters in Washington, D.C. has immediate opening for Chief of the Computer Science Unit with direct management responsibility for all aspects of data processing including:

- the design, development, and implementation of in-house computer systems.
- the operation of IBM System 370/135 DOS Installation, IBM 370/138 on order with planned transition to OS in 1979.
- the provision of technical advisory services to the member countries.

Fringe benefit package includes six weeks vacation, excellent insurance coverage and pension fund participation.

Minimum Requirements

- * B.S. degree in Engineering, Management, Computer Sciences, or related field. M.S. degree desirable.
- * Five years data processing management experience including management of system analysts, programmers, and computer operations.
- * Proven ability to work effectively with others in large scale technical projects.
- * Excellent knowledge of English with working knowledge of Spanish desirable.
- * Experience in the field of public health highly desirable.

Letter of Application should be sent to:

PASB/WHO Personnel Office
525 23rd St., N.W.
Washington, D.C. 20037

Application period closes
7 July 1978

PROGRAMMER/ANALYSTS

\$18,431 - \$23,707 Net After Tax (Senior Level)

\$14,572 - \$19,088 Net After Tax (Junior Level)

International Organization with Headquarters in Washington, D.C. has immediate openings for experienced Programmer/Analysts to function as project leader (only for senior level) and/or team members in the design, development, implementation, and maintenance of computer systems in various application areas. Responsibilities include system requirements analysis (at senior level), system design, technical specification development, programming, testing, implementation, and documentation.

Fringe benefit package includes six weeks vacation excellent insurance coverage and pension fund participation.

Minimum Requirements

- * B.A. or B.S. degree in Computer Science, Information Systems, Data Processing, Statistics, Mathematics, Accounting, Business Administration, or other related field.
- * Five years programmer/analyst experience on IBM System/360 or System/370 computer systems. Three years experience required for junior level position.
- * Thorough working knowledge of ANSI COBOL or PL/I (preferably both) and structured programming techniques required. ALC and/or FORT RAN experience desirable.
- * Thorough working knowledge of DOS JCL required. Familiarity with OS JCL desirable.
- * Data Base Management Systems experience highly desirable at the senior level.
- * Excellent English required with working knowledge of Spanish desirable.
- * Proven ability to function effectively in role of leader or member of computer system development team.

Letter of Application should be sent to:

PASB/WHO Personnel Office
525 23rd St., N.W.
Washington, D.C. 20037

Application period closes 7 July 1978

Software Engineers

Call COLLECT

(415) 966-2995

San Francisco Peninsula

GTE Sylvania is on the move. We're engaged in sophisticated communication command and control systems with some applications interfacing with large scale data bases. We are seeking SOFTWARE ENGINEERS at ALL LEVELS who wish to participate in a professional, high-technology environment using structured design and coding techniques. Experience on the following computer/languages would be desirable:

PDP/11-45 & 70, UYK-7, NOVA,
ECLIPSE, PASCAL, IFTRAN,
CMS-2, and SIMSCRIPT.

Positions also available in Arizona

All positions offer an excellent salary, plenty of career challenge, growth opportunities, plus generous benefits, including tuition reimbursement, medical, dental and life insurance, and stock purchase plan.

For immediate consideration, please call COLLECT (415) 966-2995 weekdays. If unable to call, please forward your resume with salary history in confidence to GTE Sylvania, P.O. Box 188, Mountain View, California 94042. Attn: Dept. LA-647. An equal opportunity employer, minorities and females are encouraged to apply. U.S. Citizenship is required.

GTE SYLVANIA

PROGRAMMERS

For the most individualized job search offered in the Data Processing field today, on a local or national level, Send resume to:

**SEARCH
E.D.P., INC.**

Personnel Consultants
13773 N. Central Expwy.
Suite 1305
Dallas, TX 75243

ALL FEES PAID BY
EMPLOYER

MANAGER- SYSTEMS \$40,000

Systems Integration and planning-Heavy exp. in development of on-line and direct access. Familiar with project mgmt. in integrated environment. Must be creative and experienced in dealing with all levels of mgmt. FEE PAID.

**ROBERT HALF
PERSONNEL AGENCIES, INC.**



522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

FLORIDA

ANALYST/PROGRAMMERS

We are the largest E.D.P./Financial placement service in the world. We are able to provide positions with many of the nations largest corps. If you are looking for a career advancement opportunity then doesn't it make sense to use our national, 'Fee Paid by Management' service? While you are hesitating, your friends are moving up! Don't wait till next winter, start now! A partial listing of Florida positions are shown below.

SR. SYSTEM PROGRAMMERS

Positions require large 370 internal experience. Must have SYSGEN techniques, fine tuning using OS/VSI or SVS, VSAM, SMP, PTF's background. Are you more than a skilled programmer? If you need a challenge and are looking to join an outstanding technical software group, then our clients would like to meet with you. Salary 20,000-26,000.

OPERATION ANALYSTS

Requires 3-5 years experience in 370/OS VSI, IMS or MVS operations. Must have been an operations analyst for min. 1 year; OS/VSI utilities, etc. If you are technically competent and perform well in a competitive atmosphere then don't let these opportunities pass without responding. Salary 15,000-21,000.

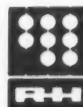
PROGRAMMER ANALYSTS

1-3 COBOL proficiency using IBM 360/370 hardware in a financial environment. Must have the ability to interface with various dept. heads/vendors and be results oriented. These positions offer challenge and opportunity to earn advancement. Salary 14,000-21,000.

RELOCATION & FEES PAID BY THE COMPANIES

MANY UNLISTED OPENINGS

Please Rush your resume and salary history in confidence to Chuck Neil, ROBERT HALF PERSONNEL AGENCIES of Miami, Inc., 1395 NW 167th St/Suite 100, Miami, Florida 33169 (305) 625-5433



**ROBERT HALF
PERSONNEL AGENCIES**

position announcements

position announcements

position announcements

position announcements

position announcements

Data Processing Professionals

THE COMPANY: GATX Corporation is a leader in Tank Car manufacturing and leasing, capital assets leasing, bulk liquid storage, heavy equipment manufacturing, liquid storage tank construction and ocean and Great Lakes shipping. We are a growing "Fortune 500" company headquartered in downtown Chicago near all public transportation.

THE ENVIRONMENT: GATX offers a highly professional and sophisticated approach to information systems management. Major hardware and software upgrades are taking place. The atmosphere is friendly, yet pervaded by challenge. GATX needs talented people with a desire for professional development in the following areas:

Data Center Manager

In need of an inventive and creative individual who is a strong and capable leader. This position requires an excellent technical background in IBM operating systems and telecommunications. The individual will have managerial responsibility for an IBM 3031 data center now under construction. The data center will be completely interactive, running under a VM operating system. CMS, DOS/VS, SVS, MVS, CICS, WYLBUR, DBMS, and more will be available under VM. This data center will tie to remote distributed processing sites over the entire country and will be one major mode of a multi-node network.

This position requires VM experience using multiple operating systems, supervisory experience, and a degree in math, computer science or engineering. MBA a plus.

Software Support Analyst

High technology staff position reporting to the corporate manager of Software Support. Responsibilities for supporting numerous data centers and many diverse systems such as CICS, SYSTEM 2000, IDMS, WYLBUR, VM/CMS, VSAM, VTAM, DOS/VS, SVS, MVS, and others. A great opportunity to join one of the up and coming data processing organizations in the mid-west. Position requires 1 to 5 years system programming experience on medium or larger scale operating systems and a BS in math or computer science or equivalent work experience.

Performance Analyst

Is operating system performance measurement and tuning your field? If so, this position will provide a springboard for projection of your ideas. This position provides the individual with total performance coordination responsibilities for all GATX data centers. This job is open ended and will provide the opportunity to deal with top management. This is a challenging position with a high degree of exposure and a great deal of satisfaction. This position requires 2 to 4 years of IBM, OS and DOS performance measurement experience with a BS in math or computer science or equivalent working experience.

Communication Support Manager

Responsible for the design and installation of a real-time communications network. The ideal person will be able to move into top level management within the MIS area. Knowledge of OS internals, communications monitors and some data base experience is required. Candidates must possess a BS in math or computer science or equivalent work experience.

Hardware Specialist

Responsible for assisting management in planning, selecting and installing hardware, software and communication systems. An excellent broad based background in large mainframes and mini computers is required. Additionally, strong consulting skills are a must. BS in business or engineering preferred.

Data Base Administrator

Wanted: Data Base Administrator for MRI System 2000 Database. Applications as well as system programming experience a big plus for this position. A good opportunity with a high degree of exposure to upper management. Requires 1 to 4 years of database experience and a degree in business or math or equivalent work experience.

We offer an excellent salary and benefits package with the opportunity for steady professional growth. For confidential consideration, send your resume to or call:

Gary Felsten or George Knorps
Corporate Employee Relations
Department 6576

GATX CORPORATION
120 South Riverside Plaza
Chicago, IL 60606
(312) 621-6576

An Equal Opportunity Employer M/F

GATX

OPERATIONS ANALYST

We are a Fortune 500 Company seeking an individual with 3 to 5 years experience in a large scale data processing operations. A thorough knowledge of OS/MVT, with MVS preferred and a good working knowledge of JCL and utilities required. Also, experience in scheduling and user liaison a must.

We can offer you an excellent starting salary and benefits package as well as an outstanding opportunity for growth. Please send your resume including salary history in complete confidence to:

CW Box 1601
797 Washington St.
Newton, MA 02160

An Equal Opportunity Employer M/F

INSTRUCTOR Data Processing

to start 8/24/78; teach and evaluate student performance in A.A.S. program. Prefer B.S. in specialty area in business. Salary range available on request. Reply immediately in writing only to Director of Employee Relations, Hudson Valley Community College, Troy, NY 12180. An Equal Opportunity/Affirmative Action Employer M/F.

EVALUATE SYSTEMS PROGRAMMERS WITH UNIQUE TEST

Independent of Computer Language and Hardware

Box 1104
Montreal, Canada H4L 4W6
tel (514) 337-4139

LIVE IN ROCKY MOUNTAINS

A Denver computer manufacturer is looking for a creative individual to participate in operating system design and implementation on a large, state-of-the-art computer. Requires degree with major in computer science or E.E. and several years experience in multiprogramming software. A broad based conceptual foundation in the various components of system software is necessary. Send resume to: DENELCOR, INC., Department of Engineering, 3115 E. 40th Ave., Denver, CO 80205.

SOFTWARE SUPPORT

An immediate career opportunity exists for a Software Support Specialist with a minimum of 5 years experience.

Applicants should preferably have experience in maintaining, modifying and extending systems software for large scale IBM mainframes, MVS or JES2 internals, MVS GENERATION. Call (208) 384-2450 or 384-3150 for appt. Write or apply in person at State Auditor's Office Rm. 100, 650 W. State, Boise, Idaho 83720.

SYSTEMS COORDINATOR

Suburban Boston div. of Fortune 500 co. seeks top business analyst to implement mfg. systems in IBM SYS-3/Mod-15, RPG II environment. Requires hvy. analysis, customer interface & programming. Must have excellent comm. skills. BS pref. Excellent oppty. in dynamic org. Salary to \$23,000. (Fee paid.) Contact Gerry Battista.

ROBERT HALF PERSONNEL AGENCIES

140 Federal St.
Boston, Mass. 02110
(617) 423-6440

FLORIDA DATA PROCESSING OPPORTUNITIES

1978 will be the best year ever for data sciences professionals in Florida and the Southeast. Some of our clients current requirements include:

DATA Base, Administrators & Specialists, IMS, DMS, IDS, others to \$30K
Technical Support, Systems Specialists to \$28K
Mini's, Real-Time, Assemblers, Fortran to \$26K
Banking Analysts, Programmers, IBM, NCR, Others to \$25K
PL/NCR Prog. Anal. Neat 3, Cobol to \$25K

If you are planning a trip to Florida, please contact us about 2 weeks in advance. Otherwise, send a resume or call:

Ms. Louise Resnick
DATA SCIENCES PERSONNEL, INC.
15490 N.W. 7 Ave.
Miami, Florida 33169
(305) 685-7891



CDSI CELEBRATES ITS 10th ANNIVERSARY

Accept the Challenges, Reap the Rewards Of Projects Like These

- Military needs technical support in developing a worldwide communications network
- University needs data base publishing and photocomposition services to produce its catalogs and annual bulletins

These are just a brief sample of the needs which CDSI has met in the past and continues to meet. From an organization with just five small contracts in 1968, we have experienced a 20-fold increase in our client base in the past decade. Our staff has expanded dramatically too during this time... but we still need more talented data processing professionals.

FINANCIAL SYSTEMS

PROGRAMMER/ANALYST - Outstanding opportunity for an ambitious programmer in analyzing, expanding and enhancing financial systems. This position requires a strong COBOL/RPG II background on IBM 360/370 OS/DOS hardware and knowledge of ALC, DOS JCL and DOS files and utilities.

APPLICATIONS SYSTEMS MANAGER - Excellent opportunity for individual with a strong accounting or financial systems background. 3 to 5 years experience in installing and supporting financial systems required. Client interface a must.

LEAD PROGRAMMER/TASK MANAGER ENERGY FIELD

Requires minimum 3-5 years programming and analysis on IBM 360/370 systems, strong background in COBOL, and experience in any of these data base management systems: ADABAS, System 2000, Mark IV or INQUIRE.

SOFTWARE CONVERSION TO UNIVAC 1110

Several opportunities currently exist for ADP professionals ranging from Project Managers to Junior Programmers to participate in a major conversion project at locations in Washington, D.C., Florida, North Carolina and California.

Responsibilities include project/task management, conversion analysis, software/file translation and programming. Qualified candidates should possess experience in one or more of the following areas:

- Conversion Task Management
- Conversion Problem Analysis
- COBOL and/or ECL programming on UNIVAC 1100 series equipment
- Fully reimbursed relocation and/or extended travel to conversion sites is one of the top benefits.

PROGRAMMER ANALYST BIO-MEDICAL STATISTICS

Career opportunity for a Programmer/Analyst with 2-5 years experience in scientific applications and a strong background in PL 1. You'll be working directly with the client in providing data processing support for a large bio-medical research study. Experience in statistical programming and familiarity with SPSS and BMD are desired.



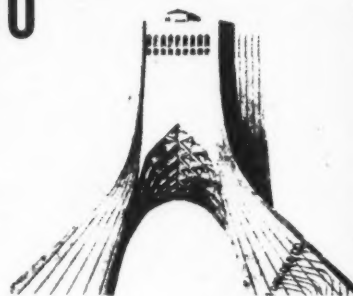
We offer competitive salaries and company paid benefits. For immediate consideration, call collect: (301) 657-1730 or send your resume to:

Computer Data Systems, Inc.

7315 Wisconsin Ave-200W
Bethesda, Md. 20014

An Equal Opportunity Employer M/F/H

RETURN TO TEHRAN NEW IRAN ASSIGNMENTS \$40,000. TAX FREE



You were there once and always wanted to go back. Here is your chance to return with an American Firm, on a US Gov't sponsored assignment for 18 months or more.

Washington D.C. interviews are now being scheduled for July 10-31st. On the spot offers, immediate assignments.

We are seeking H-6000, Level 66 Programmers, Analysts, Applications Programmers, Data Base Specialists, Systems Analysts, Communications programmers, Level 6 mini programmers, Systems programmers, Systems Engineers with exp on H-6000/Level 66, GE 635 with GCOS, COBOL, GMAP, IDS, WWWCCS, and/or TSS EXP. TDS, TPE MDQS exp is great but not req.

You will be developing advanced information systems in Tehran in a modern American environment, working with some of the best Honeywell Systems Pro's in the field. You will be earning and learning and getting to see the world. Your personal income package will meet or exceed \$40,000. USA per year, tax free of US or foreign taxes. FAMILY TOURS, with excellent fringes & benefits. To arrange in interview, call us any evening from 6PM to 10PM EDT and shoot your resume (handwritten one's OK) and we'll show you how you can advance your career in one week. Guaranteed employment on return to CONUS. Deadline July 31 firm.

Cybermetrics Corporation

Tel (703) 356-1997 till 10PM Mon-Fri

7926 Jones Branch Drive,
Suite = 550-Park Place,
McLean VA 22102

position announcements

position announcements

position announcements

position announcements

position announcements

SUNBELT PROGRAMMERS

We have many clients in the sunny recreational sunbelt area looking for programmers, programmer analysts, systems analysts, and systems programmers with IBM (OS or DOS) cobol, burroughs, assembler, Bal or CICS experience. Salaries \$14,000 to \$25,000. Submit resume with current and required salary, relocation preference to:

Executive Recruiters Personnel Agency, Inc.
3700 Cantrell Suite 104
Little Rock, AR 72205
(501) 664-3313

PROGRAMMER/ANALYSTS

**Accepting the challenge
is your job ...
Providing the challenge
is ours.**

Challenging opportunities are available now in our California, Seattle and Texas offices for professional programmer/analysts with at least 6 months experience in the following areas:

COBOL
IBM • UNIVAC • HP2100

Informatics is the nation's leader in software products and professional services. Our staff specializes in new development of major systems and has become one of the largest in the world. We're still growing ... to make room for you.

Please send resume to

INFORMATICS

c/o Bob Tamer, 1121 San Antonio Rd.
Palo Alto, CA 94303

or Mike Odom, 1025 Elm St. Suite 610
Dallas, Texas 75202

informatics inc

An equal opportunity employer

PROMOTE YOURSELF

Move up to increased pay and promotional opportunities
and the lifestyle of your choice

**SAN FRANCISCO
NEW ORLEANS
TEXAS &
SOUTHWEST
WASHINGTON
RICHMOND
FLORIDA
ATLANTA
NEW ENGLAND
MID-WEST
PHILA. AREA
TWIN CITIES
NEW YORK**

Mgr tech svcs

Fin. designer
Sys progs

IMS designers
DB Administr
Analyst/Progrs
Mini progs
Sys designers
Progr/Analyst
Hon. sys progs
Analyst/Progrs

Progr/Analyst
Programmers

Urgent Openings

IBM OS env. East & West Coast.

Data base exp a must

University sys exp or CPA.

Lrg scale 370/OS/VS. Many

openings coast to coast

Lead projects: mfg, finance

IMS DB/DC. No. Calif.

Top consulting firm. Deg.

FORT. IV. Process control, var. loc.

Banking, lrg scale, IBM. No. Calif.

PL/1. Insurance a plus. So. West

H6000, GCOS, NPS, TSS

Student & fin. applications.

University environment.

H6000, COBOL or Easycoder.

Learn IMS, TOTAL. Deg.

To

\$35M

\$34M

\$30M

\$28M

\$27M

\$26M

\$25M

\$25M

\$24M

\$24M

\$24M

\$24M

\$22M

No fees or contracts. Our client companies pay all expenses. Career consultation prior to any action. Over 1000 EDP positions represented.

Send your current resume (or an old one with pencil update) together with salary history in complete confidence to our suburban Philadelphia headquarters ... or phone:

Systems Personnel, Inc.
Suite A-27
207 Fox Lane
Wallingford, PA 19086
215-565-2920

Systems Personnel
A NATIONWIDE CAREER SERVICE

SENIOR SYSTEMS ANALYST/ MANUFACTURING

Above average growth potential for above average professionals. Dynamic ethical pharmaceutical company offers challenging projects and high visibility in return for hard work and total commitment.

College degree or equivalent, with heavy experience, especially in on-line manufacturing systems. Knowledge of commercial applications and familiarity with IBM 370 systems an advantage.

Analyst helps develop and modify EDP systems, defining requirements for improvement or replacement on a cost-effective basis. Guides systems development and implementation activities, and supervises other project personnel as required. Applies current technology to daily problem-solving. Develops systems and conversion plans.

Our location is historic Ridgefield, Conn., 60 miles from NYC. Outstanding benefit program includes major medical dental and life insurance, investment-savings plan, company paid pension, educational assistance and a unique vacation plan. Please send resume with salary history and requirements to Employment Supervisor.

BOEHRINGER INGELHEIM LTD

90 East Ridge
Ridgefield, Ct. 06877

An Equal Opportunity Employer M/F

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

PROGRAMMER/SYSTEMS ANALYST

- B.S. Degree in Computer Science
- 3 to 5 yrs experience
- Knowledge of Data Base Systems and Digital Equipment Corporation PDP 11/40 under RSTS

PROGRAMMER/INSTRUCTOR

- Minimum 2 yrs experience in programming
- Knowledge of BASIC-PLUS and teaching BASIC on secondary or post-secondary level

Send resume to:
Director of Personnel
Navajo Community College
Tsaile, Arizona 86556

Programmer/ Teacher

Computer programmer and some teaching of computer science. Master's degree in computer science and experience with BASIC-PLUS. Contact Dr. Carl Singer, Director of Computer Center, De Pauw University, Greencastle, IN. 46135. An Equal Opportunity Affirmative Action Employer.

WORLD VISION INTERNATIONAL

A nonprofit interdenominational Christian humanitarian organization. We serve through five basic ministries ... childcare, emergency aid, social action, leadership development and Evangelism.

SYSTEMS PROGRAMMER

Need experienced software specialist to provide support for dual DECSYSTEM-2050 shop. The successful candidate should show an aptitude for solving problems within a TOPS-20 operating system. Experience on a DECSYSTEM-10 or 20 is desired but not mandatory.

Interested individuals please forward their resume and salary history to:

Fin Danley, Director
Data Processing
WORLD VISION INTERNATIONAL
919 W. Huntington Drive
Monrovia, CA 91016

Computer Programmer

Significant opportunity to join expanding on-line systems group for individual with 2-3 years actual programming experience of management systems, such as inventory process scheduling or records reporting information systems. Background with Honeywell 6000 and/or DEC PDP 10 helpful. Will be involved in modifying and/or DEC PDP 10 helpful. Will be involved in modifying programs from IBM 370 OS/VS to DEC PDP 10 with heavy user interface. Good communicative skills are essential.

This position offers a competitive starting salary, superior company benefits including 4 weeks vacation and the opportunity for personal as well as professional development with a leader in the power industry located in New York City.

Please forward detailed resume indicating salary history to:

Box EWCW 1757
18 E. 48th St NY NY 10017
Equal Opportunity Employer M/F

COBOL PROGRAMMER

Invest your talents with us in exchange for excellent opportunity and a good place to live. Seeking a Dos/Vs COBOL Programmer with 3 to 5 years experience, preferably with Assembler background. Send confidential resume and salary history to:

**Frontier Federal
Savings and Loan**

Personnel Department
P.O. Box 671
Ponca City, OK 74601

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMER

Denver, Colorado

Position requires a self-starter who has a minimum of 2 years recent OS systems programming, including OS/VS 1 generation and maintenance. Should know SMP, SMF and performance analysis. Experience with CICS and data base a plus. Excellent working conditions and benefits. Send resume, including salary history to:

R. Didier

IDEAL BASIC INDUSTRIES

950 17th St.
Denver, CO 80202
equal opportunity employer m/f

Hardware Sales

Seattle, Portland

If you are currently selling Data Entry, Mini-Computer, Memory, D.D.P. of Interactive Graphic Systems, there may be an opportunity for you in the Northwest. Earnings range from 25-70K. If you are interested in exploring the possibility of living in the most desirable locale in the U.S., call me today and send resume to Gary Etchells (206) 623-6790

Murphy, Symonds & Stowell

(Management Recruiters)
Suite 1200, 2200 6th Ave.
Seattle, WA 98121

WHAT IS THE STATE-OF-THE-ART? OTHERS TALK ABOUT IT WE'VE GOT IT!

Many organizations talk about it, but we at the Systems Research and Development Organization of Federated Department Stores are actively and presently involved in it.

We are using top down design, structured programming, structured design techniques, Warnier diagrams, and structured walk throughs...

We are totally dedicated to IMS and are presently using 1.1.4 and are in the process of developing a sophisticated teleprocessing network in the United States to support over 20 operating divisions from New York to California.

WHERE DO YOU FIT IN? PROGRAMMER ANALYSTS

We are presently looking for several intermediate Programmer/Analysts and are fully prepared to train in the latest State-of-the-Art techniques. If you have solid analytical skills through two or more years work experience in OS, COBOL, and will dedicate yourself toward personal development and excellence, we will provide you the opportunity, training, and climate to truly become a current professional in management information systems.

SR. DATA BASE ANALYSTS

These professional opportunities require practical experience with the issues involved in IMS data base design.

If your background includes experience with physical and logical data base design, and knowledge of IMS utilities and how performance tools are utilized, we would like to discuss your being involved in our exciting Data Base Administration group that is currently involved in a very large scale development activity.

Your opportunity is now! As one of our software professionals, you will enjoy our technically challenging and highly professional work environment. We offer excellent compensation and benefits, including paid relocation.

For immediate and confidential consideration, rush your resume to:

Mr. Frank McKain
Systems Research & Development, Room C-73

Federated Department Stores

222 W. 7th St. Cincinnati, Ohio 45202
ALL REPLIES HELD IN STRICT CONFIDENCE
An Equal Opportunity Employer

EDP/MIS PROFESSIONALS MAJOR EXPANSION "STATE-OF-THE-ART"

Our client, a major-multi divisional corporation headquartered in lower Connecticut, is undergoing a major expansion in their MIS group. The present configuration is a large scale IBM environment (370/158's OS MFT, VSI with plans to go to MVS). The expansion has been created by a top management decision to get Data Processing much more involved in the "main-stream" of the Corporation's business.

The required backgrounds fall into three broad areas:

TECHNICAL SUPPORT

- System Programmers - Internals. 370 OS Assembler language a must. Hardware/Software evaluation a plus. COBOL - Fortran helpful.

DATA BASE SUPPORT (IMS)

- Understanding of architecture and controls of IMS/DC Control System.
- Experience in use of data dictionary system.
- Heavy exposure to end users of projected data based systems.

BUSINESS APPLICATIONS

- CICS background a big plus.
- General applications covering Accounting/Financial and Manufacturing.
- COBOL in an OS environment a must.

There are several openings in all three areas. Salaries and company benefits are extremely competitive. All fees are assumed by client company.

Please submit resume in strict confidence including salary history and requirements or call:

LESLIE, KAVANACH
EDP/Financial Placement Consultants
Suite 1300, 505 Fifth Ave. (Agency) N.Y., N.Y. 10017
(212) 661-0670
An Equal Opportunity Employer M/F

SYSTEMS ANALYSTS AND PROGRAMMERS

CMSI, a dynamic, fast growing facilities management firm has an exciting opening in Portland.

The primary requirement is for RESULTS ORIENTED people who like to solve problems and develop a variety of systems. The ability to quickly learn new applications and the potential for growth into project management is highly desirable.

Current openings exist for developing on-line systems in manufacturing.

The following experience is sought:

- Manufacturing
- On-line systems
- Data Base Management (CODASYL compliant DBMS preferred)

This position is available now in Portland, Oregon. For immediate consideration, please submit your resume and salary history in strictest confidence to:

Mr. Mel Scott
CMSI
4560 S.W. Kelly
Portland, OR 97201
Equal Opportunity Employer M/F

Commercial Applications Programmer

The Information Processing Group of Caudill Rowlett Scott, Architects, Planners, Engineers, is looking for a commercial applications programmer. The group provides data processing, word processing and computer-aided drafting services to all CRS users.

Applicants should have two to three years of commercial applications experience, using IBM mainframes (OS, JCL, COBOL, HASP, TSO) and Datapoint intelligent terminals (DOS, DATABUS).

Additional experience with data base management systems and report writers would be helpful.

Please send resume to: Linda Schoene, IP Group.



Caudill Rowlett Scott
Architects Planners Engineers

P.O. Box 22427
Houston, Texas 77027

BUY SELL SWAP

ISAM ACCOUNTS

Receivable Package

Wanted in Dibal for a PDP 11/34 digital system. Please contact Ms. Joanne Quinn at (617) 935-5860 between 9:00 a.m. and 2:00 p.m.

WANTED



299, 399 & 499s

Smith-Anderson Corp.

714-346-3227

Top dollar paid for west coast machines

For Sale or Trade

IBM 360/40G 2ch.
384K total with
256K Data Recall
EOM Core,

Available 7/1

CONTACT: R.T. Brockman
or Paula Carlisle

Universal Computer
Services, Inc.
3724 Dacoma
Houston, Texas 77092
(713) 688-7238

ZENTEC 9003 Terminals (New & Used)

Contact

Robert Worley
D.P. Mgr.
Industrial Asphalt
6840 Hayvanhurst Ave.
Van Nuys, CA. 91406
(213) 781-6080

FOR SALE

Tally Printer S/N

#6315 & 6319

DAC Model M-2100

Plus attachment
accessories

Reasonably priced

Phone (401) 737-7000
Ext. 204

For Sale

DATAPOINT

2200 Disk System

Call

Milo Schield

612: 374-9354

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

**USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR:**

☐ ☐ ☐ ☐

*a new subscription
new address
new title
new industry*

Order form is attached through binding. Be sure to include current label or label information when making a change.

first class
permit no 40760
newton ma

BUSINESS REPLY MAIL

no postage stamp necessary if mailed in the United States

postage will be paid by



COMPUTERWORLD

**797 Washington Street
Newton MA 02160**

CIRCULATION DEPARTMENT

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6
Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372-2622

Member CDA

AVAILABLE IMMEDIATELY

IBM 370/138

Memory

1-J-512K

CONTACT: Pat Milton

(214) 630-6700

Pioneer Computer Marketing

**2 PDP 11's Must Sell**

11/45 72K words, new 67Mbyte disk, new 9 track tape, 4 serial ports.

11/40 72K words, EIS, 2RK05's, 5 serial ports, new 9 track tapes.

Also: 1VT52, LA36,

LS01, 4 Modems

*OR BEST OFFER Immediate delivery. Installation and maintenance available. Manchester Fund, One Dock Square, Boston, Mass. 02109. (617) 723-5017.

CMI BUY LINES**BUY-SELL-LEASE-TRADE**

Call (313) 642-8000

3031/3032/3033

3031 Delivery 12/78

Marilyn Burchi

3420**3803****1403****2821****3333****3830****2501****1442****3330****3340****1443**

Darryl Hastings

Joe Romeo

370/165 370/168

168 Available June '78

(2) Available July '78

370/158

Ron Baker

370/155

(1) Available Now!

370**148/145/138/135**

(4) Available now to June

370/115/125

Call for Details

BUY OF THE WEEK

New Operating Lease
Plans Available For

3031 - 3032 - 3033

Call for Details

3742 Available 30 Days
System 32-B-33, 16K
9.1 Megabytes 155 LPM
Needed Now
Immediate Availability

Call Patti Lamia

360/20

All Models
Immediate Delivery
Purchase or Lease

370/135 - H

Serial #61290
IFA, ICA, 1 Channel
Available Now

370/145 - H2

3215-01, 3047-01
Needed Now

370/155 - J

DAT-3 Channels
1 Meg IBM
3215 Console
Available Now

360
30/40/50/65

Best of Values

3270 CRT's

Printers/Controllers

1130

Jim Carleton

System/3

Model 15

Jerry Roberts

3742**3741****5496**

Patti Lamia

360/20

085-083-029-059-026-129

Marie Bednarz

Call (313) 642-8000

CMI
CORPORATION

The IBM Specialists



Member Computer Dealers Association

Top of Troy, West Big Beaver and I75, Troy, MI 48084 (313) 362-1000

Don DuPuis
Windsor, Ont.
(519) 258-8910

IN CANADA CALL:

Jacques Dagenais
Montreal, Que.
(514) 374-5920

CIU COMPUTER INTERFACE TECHNOLOGY

BUY-SELL-LEASE WE'RE THE BEST IN THE WEST
FOR DEC, DG, INTERDATA EQUIPMENT
SAVE 10% to 50% ON YOUR MINI NEEDS
THIS MONTH'S SPECIALS

PDP-11/03, /04, /05, /34 CPUs, New20% off List
PDP-11 32KB Memory, New\$975
Shugart floppy, SA800/1\$450, SA400 mini, New\$285
CDL-11A,B,C,D,E, Async Interface, New\$420
PDP-11 Dual Floppy Sub-system, New\$2795
Pertec 10MB Disk, New\$4095
LP-11 Comp. 300LPM Pntr & Cont. New\$9900
Memorex Diskettes, IBM Comp., 8"ea. \$3.50
RP06 Equiv. 200MB Disk & Cont., New\$24,500

2080 South Grand, Santa Ana, CA 92705
Hot Line (714) 979-9920

BROKER-DISTRIBUTOR-MANUFACTURER

FOR SALE

HONEYWELL 64/20

64K
TAPE & DISK
READER/PUNCH
1200 LPM PRINTER

AND Complete **B-500** System

call or write D. W. GIPSON
216/833-2873
452 Lake Ave., Suite 204
Massillon, Ohio 44646

**FOR SALE**

IBM SYSTEM 32
FEATURE 1005

13.2 megabytes memory;
24K bytes storage
285 LPM printer with
64 and 48 character belts
for immediate delivery

Call: Gul Moorjani
(419) 666-2278

International Computer Services
Box 393
Toledo, OH 43691

**ICS****NEED 1 OR 2**

Varian 620F 32K GIVE

Features of CPU and I/O

(713) 528-2861

611 Harold
Houston, Texas 77006

IBM 370/145 I2

Available on 12 Month
Lease

Please call or
write to:

Bob Dickhaus
LXX Computers, Inc.
P.O. Box 157
Clarkston, Ga. 30021
(800) 241-8582

BID:

Furnishing, Delivering and Installing Computer Equipment Required for a Purchasing, Receiving and Accounts Payable System for the New York City Transit Authority, Contract R50261.

Sealed proposals for furnishing, delivering and installing computer equipment required for a Purchasing, Receiving and Accounts Payable System for the New York City Transit System will be received by The City of New York acting by the New York City Transit Authority at the office of said Authority at No. 370 Jay Street (11th floor Conference Room), Borough of Brooklyn, New York City, until August 24, 1978, at ten (10) o'clock A.M. at which time and place the proposals will be publicly opened and read. Proposals received after the date/time specified above shall be considered late bids and shall not be opened and/or considered for award. The Authority reserves the right to postpone bid opening date.

A fuller description of the work and other requirements, provisions and specifications, including qualification requirements of bidders, are given to the information, Contract Provisions, Brochure, Performance Bond and the Addenda, if any, issued by the Authority, all of which are to be deemed a part of this invitation. Contract Documents may be inspected and purchased, commencing July 3, 1978 at the office of the Authority, Room 811, upon payment of \$1.00 for each copy.

This contract is subject to a financial assistance contract between the New York City Transit Authority and the United States of America, Department of Transportation, Urban Mass Transportation Administration and in part to financial assistance from the State of New York.

All bidders will be required to certify that they are not on the U.S. Comptroller General's list of ineligible contractors for Federally financed or assisted construction.

The New York City Transit Authority hereby notifies all bidders that in regard to any contract entered into pursuant to this invitation to Bid, advertisement or solicitation, minority business enterprises will be afforded full opportunity to submit bids and/or proposals in response, and will not be subjected to discrimination on the basis of race, religion, color, sex or national origin in consideration for an award.

The Contractor will be required to comply with Federal equal employment opportunity regulations.

At the time the bidder appears to demonstrate his financial ability and to qualify as to skill and experience, he will be evaluated as to his ability to comply with the Federal equal opportunity requirements. This evaluation will include an examination of the bidder's past performance in the equal opportunity area and/or evaluation of the bidder's ability and plans to obtain participation by minority employees or businesses in the performance of the work pursuant to the Federal requirements of the contract. The bidder's attention is directed to Article 67A and Article 82, entitled "No Discrimination" and "Bid-Conditions-Affirmative Action Requirements-Equal Employment Opportunity", respectively, with which bidders, contracts and subcontractors must comply.

Award of this contract shall be subject to the approval of the City, the Urban Mass Transportation Administration, the State Comptroller, and the New York State Emergency Financial Control Board.

**THE NEW YORK CITY
TRANSIT AUTHORITY**

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Available

- CSA is the principal
- Short Term Leases Available
- Delivery & Installation Guaranteed Under Secured Documentation
- Configured To Your Needs
- Add or delete features as required
- Available immediately

Call Marv Berger at
800-225-2036

370/145
Model I, S/N 10873
Features
6982-6983-7855-8810-
3215-3046

370/135
Model H, S/N 61154
Features
4640-4655-4670-4672-
6981-7855-7861-7862

IBM 158-1 Memory
I-II (IMB)
National Semi
158 Memory (IMB)

We want to buy for delivery within 90 days

2821/2	3211/3811 (2)	3340/A2
3803/1 Dual Density	3540/1	3344/B2
3420/3 Dual Density (4)	3704/A1	

CSA

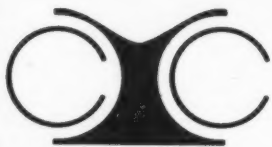
Computer Systems of America Inc.
141 Milk Street,
Boston, Ma. 02109
(617) 482-4671

CSA is a private lease underwriter with a portfolio of more than \$300 million in systems under lease to the world's largest corporations.

FOR SALE OR LEASE

AVAILABLE IMMEDIATELY

370/155 ANY MODEL w/o DAT
370/155 MEMORY UP TO 2 MEG
IBM.CMI.AMS.AMPLEX



COMPUTER
INSTALLATIONS
CORPORATION
5514 Caroline Street
Houston, Texas 77004
713-524-8249

WANTED TO BUY
DAT
ORDER POSITION
FOR 370/155

370/155 • ANY MODEL

PLEASE CONTACT:
HARRY BLAIR

SEND FOR IBM 370 PRICE CHARTS

NEEDED ASAP
158-U36
OR U34 WITH OEM MEMORY

FOR LEASE
138i
FLEXIBLE TERM BEYOND
30 MONTHS—GREAT PRICES!

FOR SALE
3270 • SYS/3-15

AMERICAN USED COMPUTER • 617-261-1100
P.O. BOX 68, KENMORE STATION, BOSTON, MASS. 02215

FOR LEASE
158

158J—SEPT 15, '78

158U-36—SELL/LEASE
NOV '78 — FEB '79

158A6 — JAN 15, '79

158U34 OR U36
SEPT 15 '78

BUY-SELL
TRADE

For Computer
Call Action Write

CAC

404/458-4425 P.O. Box 80572
Atlanta, Ga. 30366

3742-1
Dual Data Stations
3270 CRT's
Printers/Controllers

ADTEC
COMPUTER CORP.

280 Madison Avenue
New York, N.Y. 10016
(212) 532-7590

FOR SALE BY OWNER DEC PDP 11/34 RSTS-6B & 6C (Datasytem D533A-AA)

- 11/34A with 128 KW core
- 2 RP06, 176 MB ea.
- 1 TJE16 Tape System 800/1600
- 1 DZ11E 16 line MUX
- 1 LA36 Decwriter II
- 9 VT52 CRT
- 1 LP11-WA Line Printer 240/LPM Upper/Lower Case
- Expansion Cabinet; LP Interface; Tapes & Disks
- Fully DEC maintained
- Can be seen in operation
- Available immediately
- Price: \$125,000

OMAHA STEAKS INTERNATIONAL
4400 S. 96th St.
Omaha, Nebraska 68127
PHONE TOLL FREE
Alan Simon, 800-228-9521

LEASING

3031, 2, 3
yours or ours
370/138 thru 370/168

WANT TO BUY

370/158 370/168
Any 370 Peripherals
Computer Resources, Inc.
511 Phoenix St.
P.O. Box 527
South Haven, MI
(616) 637-8425

BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-9405



In Canada... let us
quote a custom-configured
IBM computer system in
new condition, with quick
delivery, at big savings
under IBM factory prices.

Don Dupuis
Windsor, Ont.
(519) 258-8910

Jacques Dagenais
Montreal, Que.
(514) 374-5920

Ron Ridding
Toronto, Ont.
(416) 683-3704

CMI —
Remember the name
CMI COMPANY

For Sale Or Lease System 3/15

Complete Systems

- SHORT OR LONG TERM
- CONFIGURED TO YOUR NEEDS
- WITH OR WITHOUT PERIPHERALS

Any configuration from B19 to D24
30 to 90 days delivery
Also complete inventory tapes — disks.
Printers — CPU Upgrades

CDB FINANCIAL, INC.

8035 East R.L. Thornton Freeway Suite 309
DALLAS, TEXAS 75228

(214) 324-3491

For Lease

New 990/4 Mini Computer
w/128K memory
10 megabyte disk
CRT Console
\$750/mo. lease
walk away after 24 mos.

Wanted

Datapoint Hardware
Disks, Printers,
Processors

Gilmore Leasing Co.
(415) 376-2653
Diana Braham or
Melisa Troyer



Mini-Computer Brokers

DEC SPECIALS

11/45 64KB

11/34-DM to 256KB

RK05-AA

MS11-JP

DL11-A-B-C-D-E-W

Spare Processor Boards
Immediate Delivery

SEVCO, INC.
22 Karal Drive
Framingham, MA 01701
(617) 879-8187

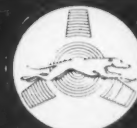
When you plan to buy or sell your computer equipment...

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.	Home Office	T. A. Takash	602-248-6037
	New York	Dick Ventola	914-949-1515
	Chicago	Pete Ahern	312-298-3910
	Dallas	M. W. Bill Tucker	214-233-1818
	San Francisco	Henry Paulson	415-283-8980
INTERNATIONAL	Canada	Don Maunder	416-366-1513
	U.K. Europe	Joe Gold	022-61-27-54
	Mexico	Andres Contreras	905-543-6850
	Austro-Asia	John Hallmark	214-233-1818
	Eurasia	Don Haworth	214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818



GO GREYHOUND

Greyhound Computer Corporation
Greyhound Tower, Phoenix, Arizona 85077

**PRICED
TO SELL**
DEC RP03'S and
TU10's DEC
maintained
COMPUCOM INC.
404-296-7600

FOR LEASE
370/158-2 megabytes system
with/ISC
370/168-4 megabytes system
with/ISC

Contact
T.J. McArdle
TIGER COMPUTER
415 Madison Avenue
N.Y.C., NY
(212) 532-1500

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALEIBM 158 Memory
I to KJIBM 168 Memory
IBM 135 Memory

For Information, Call:

George Peterson
(516) 248-0250
Frank Williams
(415) 254-7700**BRIXTON
INTERNATIONAL
ASSOCIATES**

BUY • SELL

**TELETYPE
MODELS****35 • 33 • 32****NATIONAL
TELETYPEWRITER
CORP.**207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444**IBM 158
Attached Processor
Unit
AVAILABLE
JULY, 1978**Contact: Jerry Boris
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

Why Comdisco is First in the Second Market:

145/148Machines
available
Sale or
Lease**158**U34 NOW
Sale or
Lease
ISC
w/Madrids**168**17 month
lease
Oct. 1,
1978 avail.
U35-Madrids**3033**U04
Oct. ship
17 month
lease**3420**Tape drives
Most models
Sale, Lease,
Trade**3350**A2, A2F
B2, B2F
30 day
delivery
Sale Lease**3340**B2's NOW
Sale
or Lease**3031****3032**
3033
Operating
Leases
For 1978
MachinesAtlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107**COMDISCO**New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market**AVAILABLE FOR OPERATING LEASE**3420-6's inc. dual-now
3420-8's inc. dual-now
3803-2 inc. 8100-now**FOR SALE OR OPERATING LEASE**3411-3 inc. 138, 360 feature, dual-now
3410-3's inc. dual-now
3411-1 incl. Sys 3 feature, dual-now
3420-3's single
3610-4's document printers-now
3611-A02 passbook printer-now**WANTED TO PURCHASE**

3168-4 MEG

3803-1 or 2

CALL: (203) 324-9495

STAMFORD COMPUTER GROUP, INC.927 Westover Road
Stamford, Connecticut 06902**FOR SALE**3275-2 Display Stations
3286-3 Printers
3284-3 Printers
2821-3 Control Unit
3350-B2F Disk Storage
2365-2 Proc. Stor**WANTED**3033 4th Quarter
Call or Write
(714) 833-9800
TWX 910-595-2550
SADDLEBACK
MARKETING CORP.
1401 Dove St., Suite 245
Newport Beach, CA 92660**ATTN: BURROUGHS USERS
FOR SALE**90 KB B2700-3500 Core \$14,000
B 9243 1100 LM Printer 5,000
B 3353 Multiline Cntrl. 5,000
B 2700 Aux. Cabinet 5,000All equip. currently under maintenance and guaranteed for maintenance by Burroughs.
Write or Call:**COMPUTER
MARKETING
CORPORATION**5651 N. 7th St.
Phoenix, Ariz. 85014
(602) 264-5151

America's Leading Companies Depend on us.

**Buying • Selling • Leasing
Purchase/Leaseback**3277 3803 3286
3272 3420 3284
3340 3330 3830

Call us on IBM Rental Credits. We buy your credits on FTP, ETP and MAC equipment.

Contact: Bob Haggerty 203-438-9567 or Charles Pratt 214-361-8337
R. K. Enterprises, Inc.

Marketing Centers: New York, Dallas, Atlanta, Cincinnati, Los Angeles

TIGER COMPUTER415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500A TIGER INTERNATIONAL
COMPANY**SHORT AND LONG TERM
STRAIGHT WALK-AWAY LEASES
THAT'S RIGHT!**

Tiger does not require our customers to guarantee any residual value or find qualified sub-leases at the end of the initial term on the equipment.

370/138, 148, 135, 145, 125
370/158's 168's and Peripherals
IBM Series-3031-3032-3033WE BUY • SELL & SUBLEASE
ALL IBM 370 CPU & I/O

BUY • SELL • LEASE • TRADE

**SYSTEM/3 370/115
370/125****ECONOCOM**ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap



CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

168 L - 8 Channel - June/July

165 K - DAT available - June

158 U33 - August

158 AP - new - June

155 J2 - June

145 I2 - June

135 -384K - June

158 INTEL Memory - 2 MB - July

168 - Memory - July

We also have new 168, 158, 148, and 138 Systems in July

Call Us!

Peripherals and I/OAll 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell

Wanted:

3330's, 3340's & 3420's

**CIS**CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.**FOR
SALE
OR
LEASE****370/
168**

AVAILABLE JUNE '78

(MODEL 1, 3 or A)

Bob VanHellemont

CMI CORPORATION — (313) 642-8000

**FOR SALE
OR LEASE****Burroughs B-4700 System**8 I/O Channel 150K CPU, Card
Reader, Card Punch, Line Printer,
4 Tape Cluster. 80 million characters
of head per track disk.Contact: B. Hogan
Dresser**Industries, Inc.,**

1505 Elm St

Dallas, Texas 75201

(214) 745-8809

For Sale By Owner370-135HF
(324K All IBM Core)
3046-001
3215-001Features: 3274, 3906,
4655, 4662, 6981,
7855, 7861 also
4650 not installed.Currently under IBM maintenance.
Available 11-1-78.
Asking \$195,000Call John Rapasky
(312) 755-3770**FOR SALE OR LEASE**3203-2 Printer
3340A2 Disk Storage
3340 B2 Disk Storage
3411-3 Tape Controller
& Drive
(3) 3410-3 Tape Drive
2501 B2 Card Reader
1442 N2 Card Punch
(9) 3348 Data Modules

Available September 1, 1978

**Western Marketing
and Financial**(415) 526-9221 (312) 397-3311
Fred Hegeman Chuck Gately
Jack Air**BUY · SELL · LEASE
370 SYSTEMS****FOR SALE
AVAILABLE JULY 15**

370/135 DHO (240K) CPU

4655

6981

6982

7844

7861

Power Unit Console Printer-Keyboard

CALL DICK FEEHAN (201)569-3838

DCL Marketing, Inc.

An Affiliate of Diebold Computer Leasing, Inc.

177 NORTH DEAN ST. · ENGLEWOOD, NEW JERSEY 07631

We encourage your inquiry about our unique
programs for both purchased and leased equipment.

WE WANT TO BUY

CPU

3158-U34

8/1/78

3168-L

10/15/78

Channel

2860-1 (168)

Now

PERIPHERALS370 Memory, tapes,
disks and I/OEnd Users: If you are returning CPUs or
peripherals to IBM, let us buy them with
your POCs. Your Company will benefit.

Contact: Bob Applegate

Member
Computer Dealers
AssociationComputer lease underwriters and asset managers
8150 Leesburg Pike • Vienna, Virginia 22180
(703) 790-0970**Short-Term Lease:****370/165** with/without DATModel K
Serial 60205An ideal interim solution for users who
require more processing power while wait-
ing for their 303X. Available from CSA
on very attractive short-term lease basis.

Call Marilyn Glazer at 1-800-225-2036

CSA

Computer Systems of America Inc.

141 Milk Street, Boston, Ma. 02109
(617) 482-4671CSA is a private lessor and lease underwriter with a
portfolio of \$300 million-plus of computers under lease
to the world's largest corporations.**PIONEERS IN THE USED COMPUTER INDUSTRY**

BUY

SELL

024 077 085
082 087 403
088 407 523
408 548 604**DATA
AUTOMATION
COMPANY
INC.**402 514 552 026
519 557 029 083
602 056 084 089
029 129**TRADE**

4858 CASH ROAD · DALLAS TEXAS 75247 · AC 214 637-6570

**MAJOR DEALER
IN****USED COMPUTERS
ALL SYSTEMS & PERIPHERALS****IF YOU ARE RETURNING RENTAL CREDIT
EQUIPMENT TO IBM WE CAN SAVE YOU
FREIGHT AND MAKE YOU MONEY!**The
Professionals

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																																						
<p>LEASE ONLY - LARGE SCALE IBM SYSTEMS</p> <p>DATES AVAILABLE</p> <p>3031's 11/78, 5/79, 6/79 11/79, 5/80</p> <p>3033's 6/79, 9/79, 12/79</p> <p>SHORT TERM LEASES</p> <p>3168 LK 6/78 3168 M 11/78</p> <p>For details, call R. Weissblatt-216/351-7444</p> <p>ATTENTION HONEYWELL USERS!</p> <p>66/20 For Lease—Complete System 196K Word Central Processor, including Front-end Communication Processor HIS RENTAL \$23,000/month TCP RENTALS \$ 7,000/month 64/20, 64K, Full I/O, Comm., Avail. Immed.</p> <p>For details, call Larry Donat-216/351-7444</p> <p>The Computer Place. 4650 Spring Road Brooklyn Heights, Ohio 44131 (216) 351-7444</p> <p>A Division of D&D Financial Enterprises, Inc.</p>																																										
<p>Before you buy or sell used computer equipment consult</p> <p>COMPUTER PRICE GUIDE</p> <p>"The Blue Book of Used Computers"</p> <p>Quarterly publication contains current price information about used IBM computers and peripherals. Includes newsletter about current price trends and availabilities.</p> <p>\$5 per issue — \$18 annual subscription</p> <p>Computer Merchants inc. 75 South Greeley Avenue, Chappaqua, New York 10514 Member Computer Dealers Association (914) 238 9631</p>																																										
<p>SALE or LEASE</p> <p>3271-2 CONTROL UNIT with feature 7821 029-B22 KEYPUNCH AVAILABLE IMMEDIATELY</p> <p>Niagara Computer Sales, Inc. 130 Crockett St. Syracuse, N.Y. 13207 (315) 424-0001</p>																																										
<p>FOR LEASE</p> <p>(4) 3420-3 3550 (1) 3803-1 3551 Available 8/25/78 Flexible Term/Rates</p> <p>Contact: Maria Lawrence Pacific Computer Corp. 415-798-1036</p>																																										
<p>PDP 11/10 SYSTEM</p> <p>1-PDP11/10 CPU 28K Word Core Memory Line Frequency Clock Power Fail/Restart Hardware Bootstrap Loader Console Terminal Interface (300 BAUD) 2-RK05 Disk Drives and RK11 Controller 1-DL11-A 20mA Serial Line Interface (9600 Baud) 1-H960-CA Cabinet with Fans, Power Distribution Panel, etc. Includes RT-11 Multi-User Basic and Assembler Language 12-RK05K-11 Disk Cartridges (including one diagnostic disk) Price: \$16,000 This System Has Been Under Con- tinuous DEC Maintenance Con- trol</p> <p>(715) 845-2161 Ext. 257 Computer Dept. Wausau Metals Corp. 1415 West Street Wausau, Wisconsin 54401</p>																																										
<p>Growing Northwest minicom- puter distributor wishes to purchase or market a batch accounting system written in COBOL.</p> <p>Contact: Ken Okuma 1309 114th S.E. Suite 200 Bellevue, WA 98004</p>																																										
<p>BSI</p> <p>BURROUGHS BUY-SELL-LEASE-APPRAISALS</p> <ul style="list-style-type: none"> • PROCESSORS • PERIPHERALS • TERMINALS • CONTROLS <p>2480 W. Alameda Ave. Denver, Colo. 80223 (303) 922-8331</p>																																										
<p>We encourage your inquiry about our unique programs for both purchased and leased equipment.</p> <p>AVAILABLE FOR LEASE OR SALE</p> <table border="0"> <tr> <td>CPUs</td> <td></td> </tr> <tr> <td>3125-GF</td> <td>Now</td> </tr> <tr> <td>3135-H</td> <td>10/1/78</td> </tr> <tr> <td>3145 I2</td> <td>9/15/78</td> </tr> <tr> <td>3145-J2 Short Term Lease</td> <td>9/5/78</td> </tr> <tr> <td>3155-J with DAT</td> <td>10/1/78</td> </tr> <tr> <td>3158-U34</td> <td>12/1/78</td> </tr> <tr> <td>3158-K</td> <td>12/15/78</td> </tr> <tr> <td>3158-K</td> <td>10/1/78</td> </tr> <tr> <td>3158-M35 (Also Have MP Upgrade)</td> <td>1/1/79</td> </tr> <tr> <td>TAPES</td> <td></td> </tr> <tr> <td>3411-3</td> <td>Now</td> </tr> <tr> <td>3410-3</td> <td>Now</td> </tr> <tr> <td>3420-3SD</td> <td>Now</td> </tr> <tr> <td>I/O</td> <td></td> </tr> <tr> <td>1403-N1 With UCS</td> <td>10/1/78</td> </tr> <tr> <td>1403-N1</td> <td>Now</td> </tr> <tr> <td>2821-2</td> <td>10/1/78</td> </tr> <tr> <td>2501-B1</td> <td>10/1/78</td> </tr> </table> <p>End Users: If you are returning CPUs or peripherals to IBM, let us buy them with your POCs. Your Company will benefit. Contact: Bob Applegate</p> <p>FINALCO Computer lease underwriters and asset managers 8150 Leesburg Pike • Vienna, Virginia 22180 (703) 790-0970</p>					CPUs		3125-GF	Now	3135-H	10/1/78	3145 I2	9/15/78	3145-J2 Short Term Lease	9/5/78	3155-J with DAT	10/1/78	3158-U34	12/1/78	3158-K	12/15/78	3158-K	10/1/78	3158-M35 (Also Have MP Upgrade)	1/1/79	TAPES		3411-3	Now	3410-3	Now	3420-3SD	Now	I/O		1403-N1 With UCS	10/1/78	1403-N1	Now	2821-2	10/1/78	2501-B1	10/1/78
CPUs																																										
3125-GF	Now																																									
3135-H	10/1/78																																									
3145 I2	9/15/78																																									
3145-J2 Short Term Lease	9/5/78																																									
3155-J with DAT	10/1/78																																									
3158-U34	12/1/78																																									
3158-K	12/15/78																																									
3158-K	10/1/78																																									
3158-M35 (Also Have MP Upgrade)	1/1/79																																									
TAPES																																										
3411-3	Now																																									
3410-3	Now																																									
3420-3SD	Now																																									
I/O																																										
1403-N1 With UCS	10/1/78																																									
1403-N1	Now																																									
2821-2	10/1/78																																									
2501-B1	10/1/78																																									
<p>3420-5 Tape drives</p> <p>Immediately available SALE OR LEASE</p> <p>Call Bob Bardagy COMDISCO (312) 698-3000 or your nearest COMDISCO office.</p> <p>COMDISCO</p>																																										
<p>PDP 11/45 FOR SALE</p> <p>RF-RS 2-RP03 2-TU10 256 KB + CACHE 1800 LPM Printer</p> <p>3 years under DEC maintenance COMPUTER RESOURCES (303) 771-8930 5680 South Syracuse Cr. Englewood, CO 80110</p>																																										
<p>LOWEST PRICE EVER!</p> <p>MEMOREX</p> <p>Diskettes 100% Error Free IBM Compatible</p> <p>\$2.89 Ea. Bx of 10</p> <p>Limited Time Offer TAB OF CENTRAL FLA. P.O. Box 1056 Winter Park, FL 32790 (305) 628-4429</p>																																										
<p>FOR SALE BY OWNER</p> <p>Complete DEC 11/70 System (1 year old) 192K Words 1-16 Line Multiplexor 2-RP04 Disk Drives 1-TU16 Tape Drive 1-600 LPM Line Printer (Data Printer V132C) Used 1-Console Decwriter On DEC Maintenance AVAILABLE 1 August 1978 Contact Rudy Varela (714) 744-4000 Ext. 208</p>																																										
<p>FOR SALE OR LEASE</p> <p>IBM SYSTEM 32 MODEL B33</p> <p>CALL GARY MARTIN (303) 420-2550</p>																																										
<p>FOR SUBLEASE</p> <p>370/168-U36 with 2860-3, 2870-1, (2) 2880-2. Will lease for 1-4 years guaranteed delivery and installation by October 1, 1978.</p> <p>Contact: Mr. Frederick D. Lehmann Martin Marietta Data Systems P.O. Box 5837, MP-263 Orlando, FL 32855 (305) 855-1050, Ext. 7410</p>																																										

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

CLASSIFIED ADVERTISING ORDER FORM
Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Microcom-
puter Classified Exchange, Time and Services, Software for Sale, Po-
sition Announcements and Buy/Sell/Swap. (Available upon request:
Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN
typewritten copy. Figure about 25 words to a column inch, not includ-
ing headlines.

Cost: Our rates are \$55.30 per column inch. (A column is 2" wide.)
Minimum size is two column inches (2" wide by 2" deep) and costs
\$110.60 per insertion. Extra space is available in half-inch increments
and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established
an account with us), WE MUST HAVE YOUR PAYMENT IN AD-
VANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING
COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

July Special—Order now and 2000 bps

SAVE 70%



over original price on this 2000 bps modem

Modem 2200/20 is a 4-phase synchronous data set which can be used over long distance dial-up (DDD) or dedicated telephone lines at 2000 bps. The special price for July is \$525; this is 13% under our everyday low price of \$600, and 70% below the original price of \$1780. A typical 30-month lease rate would be \$24/month.

The 2200/20 operates in full duplex, simplex, or half duplex modes. The unit is compatible with ICC's 20 LSI and WE 201A data sets.

Offer expires July 31, 1978.

Conditions of Sale

- 1) Orders must be postmarked prior to July 31, 1978 with delivery scheduled no later than October 1, 1978.
- 2) Offer subject to availability of products.
- 3) All prices are F.O.B., Miami Florida and do not include installation.
- 4) Based on Racal-Milgo Terms and Conditions.

40+ TK1 Data Station



The 40+ TK1, a high speed direct dial data station, is now available through our Special Offer Division.

The 40+ TK1 stores messages in an MOS solid-state buffer and is designed to replace low-speed, leased-line and tape oriented terminals. (Note: The 40+ TK1 can be used as a Witek replacement.) Data transmission speeds range from 1200 to 2400 bps over dial up lines. The data station includes an ICC 40+ display station, keyboard, control module, printer and desk—all for the introductory price of \$7,950 (original price was \$14,000).

Typical Savings

Original Price

Special Price

2400 bps



MODEM 2200/24

Half or full duplex operation over dial or dedicated facilities.

\$1780

\$60/mo.*

\$725

\$29/mo.*

3600 bps



MODEM 3300/36

Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up.

\$3620

\$85/mo.*

\$950

\$38/mo.*

4800 bps



MODEM 4400/48

For point-to-point synchronous operation. Operates full duplex or simplex over typical unconditioned lines.

\$4800

\$70/mo.*

\$995

\$40/mo.*

7200 bps



MODEM 4800/72

Dedicated line with optional multipoint operation for up to three 2400 bps channels.

\$6900

\$165/mo.*

\$1995

\$80/mo.*

9600 bps



MODEM 5500/96

Dedicated line with optional multipoint operation for up to four 2400 bps channels.

\$7990

\$185/mo.*

\$2995

\$120/mo.*

Prices apply to sale or lease in U.S. only. * Based on 30 month lease.

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166

Reserve now. Phone collect (305) 591-5535 or send this form.

Racal-Milgo

— the new name for ICC

I want more information about your Special Offer Division products.

☐ Yes, I am interested in the July special. Please send order form and data sheet.

☐ Purchase ☐ Lease Quantity _____

☐ I'm interested in the following:

Product	Quantity

☐ Purchase ☐ Lease

Name and Title _____

Company _____

Street _____

City _____ State _____ Zip _____

Phone No. _____

☐ Please place me on your mailing list for future specials. CW6/26

AVAILABLE

IBM 3803/1 or 2 Tape Controls
IBM 3420/3 or 5 or 6 Tape Drives
IBM 360/50 Memory (256-512)

WANTED

IBM 370/138 J - IFA & IPC
IBM 370/148 K - ISC

Call

**FORSYTHE
McARTHUR**
(312) 943-3770

Forsythe McArthur
Associates, Inc.
919 North Michigan Ave.
Chicago, IL 60611

Dealer &
Lessor in IBM
Computers

Member Computer Dealers Assoc.

FOR SALE

3277-02 Display Stations
-4630 Keyboards
-some 6350 light pens
3284-02 Printers
3286-02 Printers
3272-02 Control Units
All Available
Early July
Contact: John Redfern

CFC

179 Lyons Plain Rd.
Weston, Conn. 06883
(203) 227-5151

Dec and Data General Microcomputer Systems

General Purpose

Digital: Complete LSI-11 Family, PDP-11/03 Box, PDP-11V03 Floppy Disk System, PDP-11T03 Hard Disk System, Data Communications Accessory Modules, Instrumentation Accessory Modules, RT-11V3 Operating System Software, Fortran IV, MultiUser Basic, Business Basic, APL.

Digital: New LSI-11/2 Board Family, Processor, Memories, Interfaces, Communications, Backplanes, Software.

Digital: DECstation 78 LSI-8 Family, Floppy Disk System with optional Printers and Communications Port, OS-78 Software including Fortran IV, Basic and Commercial Basic.

Data General: Complete MicroNova Family, Processor Board, Computer, Floppy Disk System, Hard Disk System, Data Communications Accessory Modules, Instrumentation Accessory Modules, DOS Operating System Software, Fortran IV, MultiUser Basic, Business Basic, Sensor Instrumentation, HASP and 2780 Distributed Computing Work Station Software.

Word Processing

Digital: WS 78-Word Station Floppy Disk System with Optional Letter Quality Printer, High Speed Draft Printer, Communications and Optical Character Reader Interface. Document Oriented with Shorthand Dictionary, Boiler Plate Library and List Processing. OS-78 Disk Operating System Available to run Fortran IV, Basic and Commercial Basic. Also DIBOL is available to run Business Application Programs.

Digital: WT-78 Intelligent Word Terminals to run Word Processing on PDP-11 Based Shared Logic Word Processing Systems.

Digital: WS-200 Series MultiTerminal Word Processing Systems both Floppy and Hard Disk Based for three to nine Operator Stations.

DSM: RS-232 Optical Character Reader to automatically read pages of OCR ball typewriter prepared input to the Word Processing Systems.

Business

DSM: General Ledger, Payroll, Accounts Payable, Accounts Receivable, Order Entry with Inventory Control, Fixed Assets and Depreciation, Accountant's Client Write-up and Professional Time and Billing for Data General MicroNova Family and Digital LSI-11 and Word Processing System Families. Both Single-Terminal Floppy Disk and Multi-Terminal Hard Disk Systems are available.

Data Entry and Text Editing

DSM: Document Oriented RT-11 Full Screen Editor for LSI-11 Family.

Distributed Computing

Data General: HASP and 2780 Software for MicroNova Distributed Computing Work Stations.

DSM: Asynchronous and Bisync Remote Job Entry 2780 for Digital LSI-11 Family Distributed Computing Work Stations.

Call 714-560-9222, 800-532-3717 (California) or 800-854-2684 for DSM Showroom Nearest You

Data Systems Marketing Delivery from Stock

FOR SALE OR LEASE

I.B.M. 371/115

COMPLETE SYSTEM

Including software for orders entered, billing, commissions, sales analysis, accounts receivable, cash update, payroll and accounts payable.

MAIN FRAME	3115 FE
PERIPHERALS	
Printer	3203-2
Disc	3340-A2
Card Machine	2560-A2
Tape Unit with Control	3411-2
Tape Unit	3410-2

Has been under full I.B.M. maintenance - Excellent Service.
Direct from User - Going to Control System

Contact: John Fazzina, Controller

**Standard-Thomson
Corporation**

152 Grove St.
Waltham, MA 02154
(617) 894-7310

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

UPGRADING?

Sell us your 3420 Tapes
and 3330/40 Disks-
all models

- Whether you own or rent equipment, we can save you budget dollars
- Let us show you how to translate current equipment into savings

"Our leasing concepts are sensitive to your needs"



**COMPUTER
CAPITAL
CORPORATION**

1351 WASHINGTON BLVD. STAMFORD CT. 06902
203-357-9663

3340_{B2}
3350_{A2 A2F B2 B2F}

Large quantities available now.

3830-2 Control units
also available
Sale or lease

Call Bob Bardagy
COMDISCO (312) 698-3000
or your nearest COMDISCO office.

COMDISCO

SHORT OR LONG TERM
LEASES FROM

dpr

**360 SERIES
LEASE A 360 TODAY!**

If you outgrow it, DPF will provide a
larger 360 or 370 to meet
your requirements

Available August 360/65

Available August 360/50

DPF provides a full range of
IBM systems

from 30's to 168's

Call Jack Dugan (914) 428-5000

DPF Incorporated

141 Central Park Ave. So.
Hartsdale, NY 10530

dataserv

370
CPUs
System
Memory

115-138

Steve
Lacny

370
CPUs
Memory

145-148

Jim
Myers

**360
Memory**

M. J.
Dorsey

CPUs
Peripherals

360

Neal
Johnson

Returning Equipment to IBM?

Before you send any of the following
machines back to IBM, call us. We'll
show you how to make money using
your rental credits.

CPUs	Disk	Tape	110
3115	3330	3410	1442
3125	3340	3411	2501
3138	3344	3420	2821
3148	3350	3803	3505
5415	3830		3525

CPUs
Peripherals
Memory

sys13

Models 6-15

System

32-34

Mary
Cronan

Tape
Disk
I/O

**370
Peripherals**

Tom
Anderson

3741-42

Becky
Ernst

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440



buy • sell • lease • trade

URGENTLY NEEDED! ANY QUANTITY!

**DEC and
DATA GENERAL**
computer equipment

CASH AVAILABLE

CALL TODAY!



(313) 994-3200

NEWMAN COMPUTER EXCHANGE
1250 North Main Street Department CW18
P.O. Box 8610 Ann Arbor, Michigan 48107

**MOHAWK DATA SCIENCES
EQUIPMENT**

1320 Line Printers
6401 Data Recorders

7201 Bi-Sync Ctlrs
7520 Printers

- *VERY ATTRACTIVE LEASE TERMS
- *AVAILABLE IMMEDIATELY
- *ACCEPTABLE FOR MAINTENANCE



**UNICOM
COMPUTER CORP.**

2829 Bridgeway Blvd., Sausalito, CA 94965

415-332-2585 TWX 910-482-4458

IPS
201-947-4200

WANTED TO BUY

168, 158, 148, & 138's
165, 155, 145, & 135's
360/65's
All 370 peripherals
3277's - any keyboard
3272's - w/ or w/o 3250
2401 5's & 6's

IPS

Computer Marketing Corp. 2460 Lemoine Avenue Fort Lee, N.J. 07024
Telephone: (201) 947-4200 Telex: 135144

FOR SALE OR LEASE

**4 MB 168
MEMORY**

Available 7/15/78.

165K-II

4 MB w/DAT & Chnls.

158's

Many short term leases & sub-
leases available.

155J-II

Up to 2 MB w/DAT.

145-H2

4660 + 3/4 MB Intel. Avail-
able 8/30/78.

145 MEMORY

H2-J2 avail. August.

MADRIDS

145/148 2152, 6111.

138-J

Avail. 8/1. Sale or Lease.

135 MEMORY

IBM H-I, FE-GD, GD-GF. Sale
or Lease. avail. 7/1.

125-H

Avail. 8/1. Sale or lease.

65-I, IH OR J

Up to 2MB &/or 6 Chnls.

3420's

Some avail. w/controllers.

3350's

Most models avail for 3rd
Quarter delivery.

3277's

Most keyboards, remote and
local controllers available.

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

efm computer
leasing, inc.3000 marcus avenue
lake success, ny 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40	360/65
360/50	370/135
	370/145



BUYING SELLING LEASING

360/40	370/145	370/135
360/50	370/158	370/155
360/65	370/168	370/165

TAPES/DISKS/CORE

Pioneer Computer Marketing

1165 Empire Central Place Dallas, Texas 75247

214/630-6700

For Sale or Lease

IBM
SYSTEM 3464K/D2/27.1 MB
Printer Att.
(3) Data Station
Keyboard
300 LPM Printer
80 CPS Printer
other configurations available
call: JERRY BENDER
LEASING DYNAMICS, INC.
1717 E. 9th St.
Cleveland, OH 44114
(216) 687-0100

SALE

ALL
IBM Unit Record
Equipment
129 & 029's

East Coast (717) 564-8870

West Coast (415) 332-6265
(714) 754-7823Unit Record
Leasing Company110 Hi Vista Road
Sausalito, Calif.

LEASE

Sale/Lease

370/138 - w/4655, 8075 September
3344-B2F Disk Drives - July 1st.
3340-A2 & 3340-B2 Disks - July
3420-5 (S.D) July & Sept. 1st.
3803-1 Control Unit - Sept. 1st.
3203-4 Printer (1200 lpm) August
1403-N1 Printer - August
2821-2 Control Unit - August
3277-2 Display Station 4630 &
4633 August
3272-2 Control Unit (w/3250) August
1419 MICR - August
1412 MICR - off line - August

Contact: Bernie Gest

215-635-1700

Computer
Marketing Inc.

7704 Seminole Ave.

Melrose Park, Pa.

19126



Member Computer Dealers Assoc.

WAITING FOR YOUR 303X?

Datronic is offering your company tremendous savings on
purchase - leasebacks of your presently installed 138 or 148
computer system.Call Will Foss Collect Today!
(312) 992-0760

or write in confidence:

DATRONIC RENTAL CORPORATION

5210 Wesley Terrace
Chicago, Illinois 60656

BUY • SELL • LEASE

IBM 029's-129's
3277's-3741's-3742's
Peripheral Equipment

026 - \$ 800	088 - \$2500
089 - 1375	514 - 800
092 - 800	519 - 950
083 - 1800	548 - 1500
084 - 2500	552 - 900
085 - 750	557 - 2800

MOHAWK-6401-6403 • NCR-736

COMPLETE LINE BUSTERS, SHREDDERS,
DECOLLATORS AND BINDERS

OP SERVICE INC.

STAN PELC or NATALIE REYES

312-774-2556

5505 N. MENARD AVENUE, CHICAGO, ILLINOIS 60630

BUY - SELL - LEASE

-BROKERAGE-

Let the

"Nation's Largest Wholesale Dealer"
Buy, sell, lease, sub-lease, or be
your agent in placement of your
pre-owned IBM 360/370/System
3, or other unitsCOMPUTER INTERNATIONAL LTD.
BEACH COMPUTER CORP.
CWC's Leasing Division
COMPUTER WHOLESALE CORP.
(504) 581-7741Suite 507/508 First National
Bank of Commerce Bldg.
New Orleans, LA 70112
Member Computer Dealers Assoc.Know us
by our markCDA, Computer Dealers Association,
is an international nonprofit trade
association dedicated to promoting
the advantages of used computers.
For a membership roster and copy
of our code of ethics, write to:
Mr. Marvin Lurie, Executive Direc-
tor, Computer Dealers Association,
6650 Northwest Highway, Chicago,
Illinois 60631 (312) 763-7350.

303X

Leasing

Large industrial corpora-
tion wishes to purchase
and lease back to sub-
stantial corporations IBM
303X Systems. We will
only deal with end users
and equipment must be
scheduled for delivery in
1978.CW Box 1410
797 Washington St.
Newton, Mass. 02160FOR SALE
BASIC/FOUR
MODEL 400
BBII SYSTEM40k Memory
20m Bytes Disk
2 VDT's
Med. Speed Pntr (165 cps)
\$43,680.00
Call: Mike Abeyta
(505) 345-6655CERTIFIERS
WANTEDKybe CS-1600
CDC 686
must be equipped
for 1600 bpi operation
Please contact Bob Lindsey
with full details.

INDEL-DAVIS Inc. 918-224-8818

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340'sIBM UNIT RECORD
EQUIPMENT026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs: we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.7126 Mullins 77081
Houston TX (713) 656-2122
TWX 910-881-1526

EQUIPMENT CORP.

FOR SUBLEASE
370/158 MODEL U-36
FOR 26 MONTHS

WITH

FEATURES: 1433, 1434, 1435, 2150,
4650, 7840, 7905
Z08611 POWER ISOLATION

AVAILABLE: JULY/AUGUST, 1978

CONTACT: W. L. WINK

MCDONNELL DOUGLAS
AUTOMATION COMPANYP.O. BOX 516
DEPT. K063
ST. LOUIS, MISSOURI 63166
(314) 232-4508

MCAUTO®

Offices in principal cities from coast to coast.
A division of MCDONNELL DOUGLAS

Short-Term Lease:

370/158

Model	J1	KJ	U34
Serial	23104	23560	23761

An ideal interim solution for users who
require more processing power while wait-
ing for their 303X. Available immediately
from CSA on very attractive short-term
lease basis.

Call Marilyn Glazer at 1-800-225-2036

CSA

Computer Systems of America Inc.
141 Milk Street, Boston, Ma. 02109
(617) 482-4671CSA is a private lessor and lease underwriter with a
portfolio of \$300 million-plus of computers under lease
to the world's largest corporations.NOW IN CANADA DEARBORN COMPUTER GIVETH
AND TAKETH. OUR CANADIAN CUSTOMERS NOW
HAVE THEIR OWN GIVETH AND TAKETH MAN IN
CANADA. IF YOU GIVETH OR TAKETH IN CAN-
ADA CALL BILL DOWNEY AT 416/621-7060.IN THE U.S. CALL TOM MILLUNCHICK AT
312/827-9200. IN CANADA CALL BILL DOWNEY AT
416/621-7060.dearborn
computer companydealer-IBM computers
systems software
leasing1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788DEC
HARDWARE
PDP 11 PDP 8
Processors Peripherals
MemoriesVT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800★
NEW DG NOVA 3/12'sWITH BATTERY BACKUP AND
AUTO PROGRAM LOAD
AND RESTART
NEW DG MEMORY
32 OR 16 KBIMMEDIATE DELIVERY WITH
22% DISCOUNTCALL CLARK & ASSOC.
(816) 741-3183

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap	
FOR SALE 1403 - 2 CDC 2314 3286 - 2 3344 - BF2 5410 - A14 5444-A2 3741 - 1 5496 - 1  7232 Boone Ave. No. Suite 38 Minneapolis, MN 55428 PHONE: 612/533-5800		FOR SALE Immediate Delivery. SYS- TEM/3 Model 10 16K, 5444 A2 Disk, 5203 300 LPM Print. 150 CPM MFCU & Data Recorder. YANKEE OIL CO. INC 1071 Dwight St. Springfield, MA (413) 736-2753		LEASING? YOUR 168,158,148,145,138 OR OURS ■ We'll write a short-term or long-term lease — on YOUR system or OURS ■ We'll configure a total system or part of one to your specifications " Our leasing concepts are sensitive to your needs "  COMPUTER CAPITAL CORPORATION 1351 WASHINGTON BLVD. STAMFORD CT. 06902 203-357-9663	
FOR SALE/LEASE/TELEX 8 - 6420-7 Tape Drives 1 - 6803 Control August Delivery AMERICAN COMPUTER & FINANCIAL CORP. 17 East Orange St. Chagrin Falls, OH 44022 (216) 247-3232					

BUY **Surplus DEC And Data General Hardware** For Sale (305) 272-8753 SELL

PHIL THOMAS

Thomas Business Systems, Inc.

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Route 208
Wallkill, N.Y. 12584
914-895-2007

370/125's

For Sale* Lease* Purchase
***Purchase Leaseback**

Specialists in 125 Systems
Also All Peripheral Units

 **CORPORATE COMPUTERS, INC.**
(203) 661-1500
115 Mason St., Greenwich, CT 06830

DEC
HARDWARE
PDP11-PDP8
LSI-11's
Processors Peripherals
Memories
VT52'S LA36'S
LS120'S LA180'S
Also available
Other printers and discs
available with controllers
for most minicomputers.


NATIONAL DATA
SALES CORP.
516/944-7444

**MINICOMPUTERS
& SYSTEMS**
Don't waste company time or
money. Check with us before you
buy or sell.

New DEC Equipment
Immediate Delivery
RK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off
list
DZ 11
DEC Station 78
New DG Equipment
Immediate Delivery
DG 10 Mbyte Disk Systems from
\$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list
Immediate delivery for MOS!
Inventory Clearance
call us for free brochure

**MINICOMPUTER
EXCHANGE**
(408) 733-4400
TWX 910-339-9272

CENTRON
Computer Corporation
The THINKING person's alternative . . .

BUY • SELL • LEASE
IBM Computer Equipment
360/370/30XX and Peripherals
Call us for current availability and pricing
612/884-3366
8120 Penn Avenue South • Minneapolis, Minnesota 55431

**GRAPHIC RESOURCES
CORPORATION**
The Graphics Specialists
Plotters-Sale, Purchase, Leasing
Plotter Supplies-Manufacturer
Plotter Re-Conditioning
Services & Parts
Interactive Graphic Systems
Line Printers
All Manufacturer's Equipment
Available

GRAPHIC RESOURCES CORP.
Offices Located In:
Los Angeles, Houston
Denver, Washington, D.C.
CORPORATE OFFICE:
(213) 598-3318 (714) 898-3584
5442 Research Drive
Huntington Beach, Calif. 92649
CALL OR WRITE FOR FREE
BROCHURES & SAMPLE
PLOTTER MATERIAL SWATCH

**BEFORE YOU BUY, SELL, OR LEASE,
TAKE A 'SECOND' LOOK!**

FOR SALE

3135-H with 4655, 6981, 7861, 3215
Delivery 8/78
3145-HO with 512K Add-On CMI Memory
Delivery 5/78
3155-J with DAT Box—Delivery 7/78
3158-K—Delivery 6/78
3158-K—Delivery 8/78
3158-U34—Delivery 8/78
3031 Lease—Delivery 10/78

WANT TO BUY
3145-J2—Inst. 7/78

1442-N2 3830-2
2821-1 2880-2



3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX-810/757-3654

CHICAGO — 312/298-5650
WASHINGTON — 301/229-7200
LOS ANGELES — 213/370-4844

**COMPUTER
SALES INTERNATIONAL, INC.**
901 Office Park Plaza • Oklahoma City, Ok 73105 405-840-1911

Houston, Tex. 713-444-0246  St. Louis, Mo. 314-727-7010

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 200	\$20/Mo	059	\$1400	\$50/Mo	129	\$3400	\$110/Mo
026	\$ 800	\$30/Mo	082	\$ 800	\$30/Mo	514	\$ 800	\$ 45/Mo
029	\$1800	\$55/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 55/Mo
046	\$ 900	\$40/Mo	084	\$2500	\$90/Mo	526	\$1200	\$ 50/Mo
047	\$1400	\$60/Mo	085	\$1200	\$60/Mo	548	\$1500	\$ 60/Mo
056	\$ 200	\$15/Mo	088	\$2500	\$150/Mo	557	\$2900	\$100/Mo

Sale: 360/20 system: \$9500. WANTED TO BUY: 3741 - \$3800
3742 - \$3900
Rental credit 029 & 129

THOMAS COMPUTER CORPORATION
600 N. McClura Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

For Sale
360/65

With 1-1/2 megs Fabritek
Will reconfigure

Available Now



Computer Concepts, Inc.
6443 S.W. Beaverton Hwy.
Portland, Oregon 97221
(503) 297-4721

SOFTWARE

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided
Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

OTS

ECONOMICAL

ONLINE PROGRAMMING

- Full Screen Edit Facility
- PDS and Sequential Files
- Panvalet Interface
- Librarian Interface
- Slick Interface
- Batch Job Submit; Data Set and Catalog Utilities; HASP and VS1 Print Interfaces; Extended Command Language; Data Security and Logging; Online Compiles; User Task Facility; Dynamic Data Set Allocation; 3270 Local and Remote.

OS and VS
BTAM and VTAM
JLB SYSTEMS
3930 SW Kanan
Portland, Or. 97221
(503) 248-1474

software for sale

software for sale

software for sale

time & services

time & services



converting?

TRY THE EXPERTS

DASD Corporation encourages test evaluations of all of our language translators.

If you're going from: To:

RPG/RPG II	ANS COBOL (DOS or OS)
SYSTEM 3 COBOL	ANS COBOL-OS
DOS COBOL	ANS COBOL-OS
GE MAP	ANS COBOL-OS
360/20 BAL	360/370 ALC-OS
AUTOCODER	ANS COBOL-OS
NEAT/3	COBOL

... DASD has an immediate solution to your conversion problems.

Call or write today

DASD
CORPORATION

DASD Corporation
National Marketing
1480 Renaissance Drive, Suite 315
Park Ridge, Illinois 60068
312/299-5005

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 935-5121
P.O. Box 160
Plymouth, IN 46563

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming Watslines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS-2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

COMPUTER TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

370/158 MVS 4 MEG

WYLBUR
IMS 1.1.4 DB/DC
7 Days/24 Hours
High/Low Speed Terminals
RJE and Batch
2- Xerox 1200 Printing
Systems
Full Key Entry Service

THOMAS NATIONAL

1775 Broadway, NYC
212-765-8500

asTEC leTEC opTEC

THE BETTER SPOOLER

asTEC is the fastest and most efficient DOS-DOS/VS spooler available. F0 execution; early device start; SYSIN feature; partition balancing; spool compression; imbedded forms change; multiple copy; multiple spool extents; pseudo device assignments. Object code driven, attaches itself as a logical extension of DOS-DOS/VS at initialization. Self regulating to supervisor in use.

RELOCATING LINKAGE EDITOR

leTEC is an enhancement to the DOS linkage editor and loader to allow program phases to execute in any DOS partition. Needs no extra core image blocks to store a program; DOS utilities and compilers will execute in all partitions. Installs in a few minutes and is entirely object code driven.

SMOOTHER OPERATIONS

opTEC an all-time bargain in software. A collection of operator transient replacements which provide a more flexible operating environment under DOS-DOS/VS. Benefits include: reduced operator training; output messages have been shortened; allows abbreviated response; report separator (cover page) capability. The use of the standard keywords is not negated, however, providing for smooth transition to new responses.

For additional information
call or write:
Mr. John Kinney
Computer Industries Corp.
1501 Euclid Ave.
Cleveland, Ohio 44115
(216) 579-0200

PAYROLL PERSONNEL SUPER/PAY ONLY \$960 ANS COBOL 60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase

Easy To Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

WHY DEVELOP SOFTWARE WHEN YOU CAN BUY SOFTWARE?

We've got the software you need. Now.

PAYROLL/PERSONNEL
ACCOUNTS PAYABLE
TAXBREAK/TAXCOST

(Payroll Tax Calculation Modules)

Call us. (415) 845-7991



argonaut
Information Systems, Inc.
2140 Shattuck Ave.
Berkeley, CA 94704

RPG TO COBOL

Dataware's software translator converts RPG and PPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code.

- RPG/RPG II to PL/1
- PL/1 to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today



Dataware, Inc.
495 Delaware Street
Tonawanda, N.Y. 14150
(716) 695-1412

TIME

Computer Time Brokers & Specialists

- On-site or remote processing
- Serving the Tri-State Area

BROOKE COMPUTER CORP.

250 W. 57 ST., NEW YORK, NY 10019
212/586-0923

WE ARE BROKERS OF COMPUTER TIME

New York & New Jersey Only
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

370/158 mod 3 Datacenter

3.5 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

DATA PROCESSING SERVICES

Altec Lansing, a leader in sound reproduction, is looking for users for its data processing equipment.

We can provide complete service for the first time user or partition time for current users. Some stand alone time is also available during prime time.

EQUIPMENT AVAILABLE

- 1 360/50 IBM CPU 256K 3 CHANNEL
- 14 2314 TYPE DISK DRIVES
- 4 3420-5 TYPE TAPE DRIVES 1 D/D
- 1 2540 CARD READER/PUNCH
- 1 1403N1 PRINTER

- 2780/3780 SOFTWARE SUPPORT
- 3 PARTITION DOS WITH SPOOLER
- SORTER, INTERPRETER, BURSTER AND DECOLLATER AVAILABLE.

Please Contact:

ALTEC CORPORATION

1515 South Manchester
Anaheim, CA 92803
(714) 774-2900 Ext. 237/250

ITS HERE

TONE 4 MVS

HYPER - FORMANCE TSO

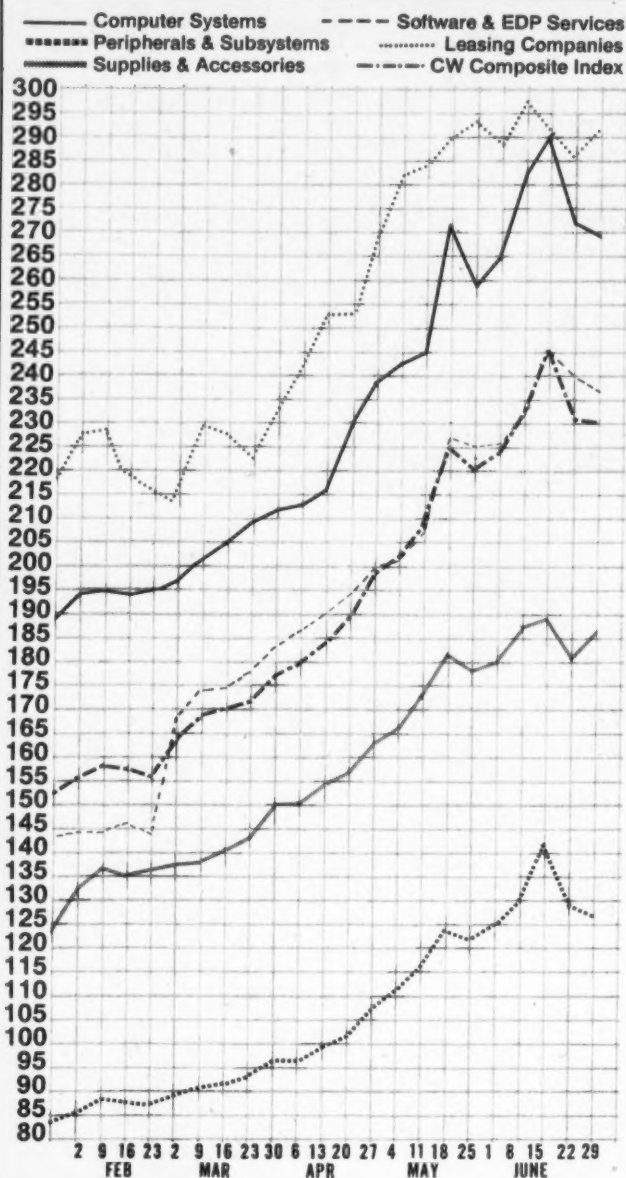
- Standard IBM-TSO command structure
- No swapping - no TCAM
- Instant interrupt
- Informational screen formatting
- Full Screen Edit
- Multiple users in one address space
- Programmable/retrievable PA/PF keys

FIRST WE MADE IBM TSO RUN WITH VS1
NOW WE'RE MAKING IT FLY WITH MVS

TONE
Software Corp.

Write
for
Details

1124 N. GILBERT
ANAHEIM, CA 92801
(714) 991-9460



Earnings Reports

APPLIED DATA RESEARCH

Three Months Ended March 31

	1978	1977
Shr Ernd	\$.29	\$.25
Revenue	4,550,642	3,537,083
Disc Op	12,224
Earnings	398,472	337,755

a-Restated to reflect discontinued operations.

CALIFORNIA COMPUTER

Three Months Ended April 2

	1978	1977
Shr Ernd	\$.09
Revenue	29,833,000	\$26,466,000
Tax Cred	a349,000
Earnings	987,000	(1,672,000)
9 Mo Shr	29
Revenue	85,448,000	86,053,000
Earnings	318,000	(1,015,000)

a-From tax-loss carryforward.

COMPUTERVISION

Three Months Ended March 31

	1978	1977
Shr Ernd	\$.31	\$.21
Revenue	13,828,000	10,497,000
Earnings	753,000	494,000

DATA 100

Three Months Ended March 31

	1978	1977
Shr Ernd	\$.22	\$.30
Revenue	36,947,000	28,937,000
Tax Cred	a140,000
Earnings	1,442,000	1,314,000

a-From tax-loss carryforward.

MTS SYSTEMS

Three Months Ended March 31

	1978	1977
Shr Ernd	\$.51	\$.45
Revenue	10,282,000	7,876,500
Earnings	863,100	741,500
6 Mo Shr	1.03	.87
Revenue	20,000,800	14,835,200
Earnings	1,736,700	1,431,800

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreihof
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Ron Evans
Frank Collins
Account Managers
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
District Manager
Peter Senft
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Judy Milford
Account Managers
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

Japan
Mr. Shigema Takahashi
General Manager
Dempa/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jürgen Ballnath
CW PUBLIKATIONEN
Friedrichstrasse 31
8000 Munich 40
West Germany
Phone: (089) 34-90-61
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

PRICE						PRICE						PRICE					
		1977-78	CLOSE	WEEK	WEEK			1977-78	CLOSE	WEEK	WEEK			1977-78	CLOSE	WEEK	WEEK
		RANGE	JUN 28	NET	PCT			RANGE	JUN 28	NET	PCT			RANGE	JUN 28	NET	PCT
		(1)	1978	CHNGE	CHNGE			(1)	1978	CHNGE	CHNGE			(1)	1978	CHNGE	CHNGE
COMPUTER SYSTEMS																	
A	AMDAHL CORP	22-39	34 7/8	-1 5/8	-4.4	O	ADVANCED COMP TECH	0-2	1 1/4	0	0.0	O	DATA ACCESS SYSTEMS	4-5	5 1/2	-1/4	-4.3
N	BURROUGHS CORP	55-91	72	-1 1/4	-1.7	O	ANACOMP INC	7-20	17 1/4	-1/8	-0.7	O	DATA 100	6-17	14 3/4	-1/4	-1.6
C	COMPUTER AUTOMATION	18-38	33	0	0.0	A	APPLIED DATA RES.	5-16	14 5/8	+1/8	+0.8	A	DATA PRODUCTS CORP	9-24	20 5/8	+1/4	+1.2
N	CONTROL DATA CORP	20-36	33 1/8	+1/4	+0.7	N	AUTOMATIC DATA PROC	23-34	30 3/4	-3/4	-2.3	O	DATA TECHNOLOGY	3-4	4 1/4	+1/8	+3.0
C	CRAY RESEARCH INC	15-46	40 1/2	+3 1/4	+8.7	O	COLEMAN AMERICAN COS	1-2	1 7/8	0	0.0	O	DATUM INC	1-4	3	-3/4	-20.0
N	DATA GENERAL CORP	35-61	54 1/2	-1 3/8	-2.4	O	COMPU-SERV NETWORK	7-15	9 3/4	-1/4	-2.5	O	DECISION DATA COMPUT	2-4	3 3/8	-1/4	-6.8
N	DATAPoint CORP	18-64	57 1/2	-1	-1.7	O	COMP ELECTION SYSTMS	6-10	9	-1/4	-2.7	O	DELTA DATA SYSTEMS	1-1	5/8	0	0.0
N	DIGITAL EQUIPMENT	37-53	46 7/8	-7/8	-1.8	C	COMPUTER HORIZONS	1-4	4 1/2	+1/2	+12.5	A	DOCUMENTATION INC	6-24	22 7/8	+1 5/8	+7.6
N	ELECTRONIC ASSOC.	2-8	6	-3/4	-11.1	C	COMPUTER NETWORK	6-12	10 5/8	-3/4	-6.5	O	DATARAM CORP	2-24	18 3/4	+3/4	+4.1
A	ELECTRONIC ENGINEER.	8-19	17 3/8	-1	-5.4	N	COMPUTER SCIENCES	7-13	10 3/8	-3/8	-3.4	N	ELECTRONIC M & M	4-7	6	-1/4	-4.0
O	FOUR-PHASE SYSTEMS	13-32	28 3/8	-5/8	-2.1	C	COMPUTER TASK GROUP	1-4	3 1/4	0	0.0	O	FABRI-TEK	1-2	1 5/8	-	-3.7
N	FOXBORO	28-54	36 1/2	0	0.0	O	COMPUTER USAGE	1-4	2 5/8	0	0.0	O	GENERAL COMPUTER SYS	0-2	1 3/8	-1/8	-8.3
O	GENERAL AUTOMATION	6-19	16 3/4	-7/8	-4.9	O	CONSHARE	5-17	13	-1 1/4	-8.7	N	HAZELTINE CORP	8-16	13 1/2	-3/4	-5.2
O	GRI COMPUTER CORP	1-1	1 5/8	0	0.0	O	DATA DIMENSIONS INC	3-7	5 1/2	-3/4	-12.0	N	HARRIS CORP	28-61	54 1/4	+1/4	+0.2
N	HEWLETT-PACKARD CO	62-87	80 1/4	+1	+1.2	O	DATATAB	1-2	1	0	0.0	O	INFORMEX INC	4-10	8 1/8	-1/2	-5.7
N	HONEYWELL INC	43-59	55 5/8	-1 1/8	-1.9	N	ELECTRONIC DATA SYS.	14-23	19 7/8	+1 1/8	+6.0	O	INFORMATION INTL INC	8-14	8 3/4	-1/2	-5.4
N	IBM	236-266	261 3/4	-6 1/4	-2.3	O	INSYTE CORP	2-3	2	-1/8	-5.8	O	INTEL CORP	38-62	57	0	0.0
C	MANAGEMENT ASSIST	5-18	15	+3/4	+5.2	C	IPS COMPUTER MARKET.	1-2	2 3/8	0	0.0	A	LUNDY ELECTRONICS	3-6	3 5/8	+1/8	+3.5
O	MICRODATA CORP	7-18	16 1/8	-1	-5.8	O	KEANE ASSOCIATES	3-6	5 5/8	+1/8	+2.2	O	MST DATA CORP	6-17	15 3/4	-1	-5.9
O	MINI-COMPUTER SYST	5-12	5	-1/4	-4.7	O	KEYDATA CORP	1-3	2 3/8	-1/8	-5.0	N	MEMOREX	23-49	45 1/2	+4 3/8	+10.6
O	MODULAR COMPUTER SYS	5-15	13 1/8	+3/8	+2.9	A	LOGICON	7-17	11 1/8	-1 1/8	-9.1	N	MEMORAX DATA SCI	5-12	10	0	0.0
N	NCR	32-58	54 1/8	+1/8	+0.2	A	MANAGEMENT DATA	1-2	1 1/8	0	0.0	O	PENRIL CORP	2-12	8 7/8	-7/8	-8.9
C	PRIME COMPUTER INC	12-32	29 3/4	+1 1/2	+5.3	A	NATIONAL CSS INC	10-28	25 1/2	+1 1/2	+6.2	N	PERTEC CORP	7-14	10 7/8	-1/8	-1.1
N	PERKIN-ELMER	17-26	23	-3/8	-1.6	O	NATIONAL DATA CORP	4-12	10 1/4	-3/8	-3.5	A	PETER INSTRUMENT	2-2	1 3/4	0	0.0
N	RAYTHEON CO	16-50	47	+3	+6.8	A	ON LINE SYSTEMS INC	16-26	22 3/4	+1/8	+0.5	O	PRECISION INST.	2-2	2	0	0.0
N	SPERRY RAND	30-45	42	0	0.0	N	PLANNING RESEARCH	3-8	7 3/8	0	0.0	C	QUANTOR CORP	2-5	2 1/2	+1/8	+5.2
O	SYCOR INC	8-24	23 1/2	0	0.0	O	PROGRAMMING & SYS	1-1	3/4	0	0.0	O	RECOGNITION EQUIP	6-12	10 3/4	-3/8	-3.3
A	SYSTEMS ENG. LABS	5-21	17 5/8	-1/2	-2.7	O	RAPIDATA INC	2-6	4 3/4	-1/4	-5.0	O	SCAN DATA	1-4	3	-1/8	-4.0
A	WANG LABS.	10-26	22 7/8	+1/4	+1.1	O	REYNOLDS & REYNOLD	17-28	26 1/4	+3/4	+2.9	N	STORAGE TECHNOLOGY	10-46	20	-1 1/4	-5.8
						O	SCIENTIFIC COMPUTERS	1-6	5	-1/8	-2.4	O	T BAR INC	7-19	16 3/4	-1/4	-1.4
						O	TYMSHARE INC	14-27	24	-1/4	-1.0	A	TALLY CORP.	4-9	7 1/8	-1/2	-6.5
						A	URS SYSTEMS	4-7	6 1/2	-3/8	-5.4	A	TEC INC	6-10	10	+3/4	+8.1
						N	WYLY CORP	1-5	4	+1/8	+3.2	N	TEKTRONIX INC	29-45	40 5/8	-7/8	-2.1
												N	TELEX	2-7	5 1/2	+1/4	+4.7
												O	TESDATA SYSTEMS CP	13-20	15 1/2	-1 1/2	-8.8
												C	WILTEK INC	1-1	1 3/8	+1/8	+10.0
PERIPHERALS & SUBSYSTEMS																	
N	ADDRESSOGRAPH-MULT	10-25	20 7/8	-2 3/4	-11.6												
O	ADVANCED MEMORY SYS	7-14	13	+3/8	+2.9												
N	AMPEX CORP	8-17	13 7/8	-1/2	-3.4												
O	ANDERSON JACOBSON	3-9	7 1/8	0	0.0												
N	APPLIED DIG DATA SYS	10-20	14 7/8	-1 1/8	-7.0												
A	BEEHIVE INT'L	4-12	4 1/2	+1/4	+5.8												
A	BOLY-BERANEK & NEW	6-11	8 5/8	-5/8	-6.7												
N	BUNKER-RAND	8-18	16 1/8	+1/8	+0.7												
A	CALCOMP	3-9	7 1/2	+1/8	+1.6												
O	CAMBRIDGE MEMORIES	1-8	6 1/4	+5/8	+11.1												
N	CENTRONICS DATA COMP	16-30	26 7/8	-1/2	-1.8												
O	COGNITRONICS	1-4	3 1/2	+1/2	+16.6												
O	COMPUTER COMMUN.	5-10	8 5/8	-3/8	-4.1												
O	COMPUTER CONSOLES	4-9	7 1/2	-3/4	-9.0												
A	COMPUTER EQUIPMENT	2-6	4	-3/4	-15.7												
O	COMPUTER TRANSCIVER	1-1	1 5/8	0	0.0												
O	CONTEN	9-28	22 3/4	0	0.0												
N	CONRAC CORP	19-28	20 3/4	-7/8	-4.0												
SUPPLIES & ACCESSORIES																	
A	AMERICAN BUS PRODS	6-9	9 1/4	+1	+12.1												
O	BALTIMORE BUS FORMS	1-5	4 1/4	-1/4	-5.5												
A	BARRY WRIGHT	10-28	22 7/8	+7/8	+3.9												
O	CYBERMATHICS INC	1-1	1 3/8	+1/4	+22.2												
C	DUPLEX PRODUCTS INC	14-27	24 7/8	-3/8	-1.4												
N	ENNIS BUS. FORMS	6-17	14	-3/8	-2.6												
N	3M COMPANY	43-57	54 1/2	-3/8	-0.6												
O	MOORE CORP LTD	24-37	33 1/4	0	0.0												
N	NASHUA CORP	16-31	26 1/4	-1/4	-0.9												
O	STANDARD REGISTER	18-26	22 1/2	+1 1/2	+7.1												
A	TAB PRODUCTS CO	5-13	12 3/8	-3/4	-5.7												
N	UABCO	18-27	24 1/4	-1/2	-2.0												
A	WABASH MAGNETICS	10-15	12 7/8	-1/8	-0.9												
N	WALLACE BUS FORMS	17-26	26 1/4	+2 1/4	+9.3												

EXCH: M=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; N=MINIOWEST; O=OVER-THE-COUNTER
J-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Discover

the one organized (and inexpensive)
way to keep up with what's new in
computer techniques and management—

The Library of Computer and Information Sciences

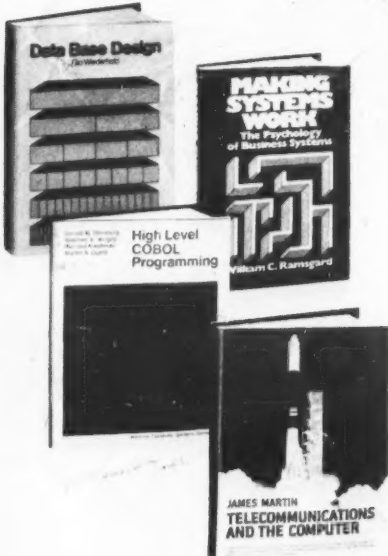
and start with
a whale of a value:
**Take any 3
books for
only \$3.95**
(values to \$60.00)

If you will join now for a trial period
and take three more books
—at handsome discount prices—
within the next 12 months

41635. DATA BASE SYSTEMS: Design, Implementation, and Management. Ronald G. Ross. For managers and technicians—a handbook that provides detailed information on everything from data base administration to data base access methods. **\$19.95**

72690. THE PSYCHOLOGY OF COMPUTER PROGRAMMING. Gerald M. Weinberg. The classic study of computer programming as a human activity. **\$10.95**

52900. HIGH LEVEL COBOL PROGRAMMING. Gerald M. Weinberg, Stephen E. Wright, Richard Kauffman and Martin A. Goetz. An advanced guide to proper and efficient COBOL usage. Introduces "sheltered programming" concepts, stresses modular design and maintainability of code. **\$17.95**



42217. A DICTIONARY OF MICROCOMPUTING. Philip E. Burton. Over 900 definitions, complete with supporting examples, sketches, diagrams, and tables. **\$12.50**

84385. TOP-DOWN STRUCTURED PROGRAMMING TECHNIQUES. Clement McGowan and John R. Kelly. Practical solutions in actual code serve to introduce this revolutionary concept. **\$14.95**

62620. MICROCOMPUTER HANDBOOK. Charles J. Sippl. Detailed references to the technology and applications of microprocessors. **\$19.95**

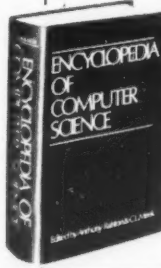
41670-2. DATA BASE DESIGN. Gio Wiederhold. Excellent sourcebook for the methods, principles, and concepts relevant to the design of data base software. Counts as 2 of your 3 books. **\$21.50**

82730-2. TELECOMMUNICATIONS AND THE COMPUTER. James Martin. All-new, updated edition of the classic reference covers network structures, transmission media, international standards, and much more. With over 100 diagrams and illustrations. Counts as 2 of your 3 books. **\$29.50**

80830. STRUCTURED COMPUTER ORGANIZATIONS. Andrew S. Tanenbaum. A practical look at computer architecture concepts from the microprogramming level to the operating system. **\$19.50**

59555. MAKING SYSTEMS WORK. William C. Ramsgard. Examines specific, tested new tools for improved information processing. **\$18.95**

EXTRAORDINARY VALUE!



44900-3. ENCYCLOPEDIA OF COMPUTER SCIENCE. Edited by Anthony Ralston and Chester L. Meek. More than 1550 outsize pages of information on every aspect of computer science—from algebra to automata theory, from basic terminology to string-processing languages. 470 articles by 208 experts. Over 700 charts, tables, graphs, and diagrams. Counts as 3 of your 3 books. **\$60.00**

80530. STATISTICAL METHODS FOR DIGITAL COMPUTERS. Edited by Kurt Einslein, et al. How to implement specific statistical techniques on the computer. With flowcharts and sample Fortran code. **\$19.95**

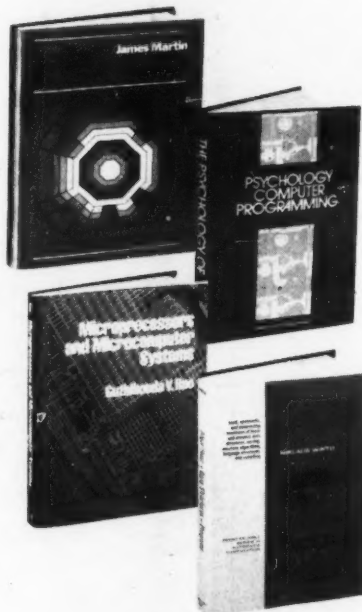
34376. THE ARCHITECTURE OF CONCURRENT PROGRAMS. Per Brinch Hansen. How to build reliable operating systems and real-time control programs. Uses a structured language called Concurrent Pascal. **\$18.00**

62651-2. MICROPROCESSORS AND MICRO-COMPUTER SYSTEMS. G. V. Rao. Highlights the latest microelectronic and microcomputer technology. Counts as 2 of your 3 books. **\$24.50**

78350. SIMULATION WITH GPSS AND GPSS V. Bobillier, Kahan, and Probst. A detailed approach to the effective planning and execution of simulation experiments and projects. With concrete examples. **\$18.50**

83830-2. THE THEORY OF INFORMATION AND CODING. Robert J. McEliece. An up-to-date look at the mathematical approach to communications, this practical reference covers such topics as discrete memoryless and Gaussian channels, the source-channel coding theorem, linear codes, BCH codes, convolutional codes, and variable-length codes. Counts as 2 of your 3 books. **\$21.50**

37580. CHESS AND COMPUTERS. David Levy. With illustrative games that show how to apply computer skills to chess problems. Softbound. **\$7.95**



82560. TECHNIQUES OF PROGRAM STRUCTURE AND DESIGN. Edward Yourdon. Over 300 illustrative problems, 90 valuable references, and four demonstration projects. **\$19.50**

70110. PRINCIPLES OF DATA-BASE MANAGEMENT. James Martin. Covers data structures, security, file storage, real-time vs. non-real time, more. **\$19.95**

32485. ALGORITHMS + DATA STRUCTURES = PROGRAMS. Niklaus Wirth. A classic work on structured programming with practical examples. **\$19.95**

39980. COMPUTER-COMMUNICATION NETWORK DESIGN AND ANALYSIS. Mischa Schwartz. An organized, quantitative approach to the design of communications networks. **\$21.50**

(Publishers' Prices shown)

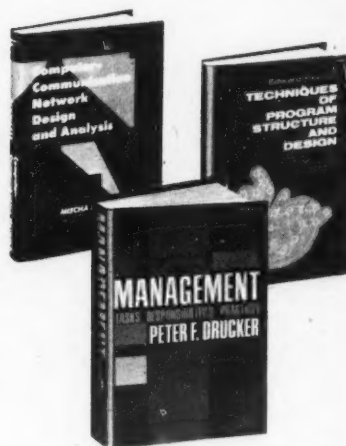
MEMBERSHIP BENEFITS • In addition to getting three books for only \$3.95 when you join, you keep saving substantially on the books you buy. • If you continue membership past the trial period, you will be eligible for our Bonus Book Plan, with savings of at least 70% off publishers' prices. • At 3-4 week intervals (15 times per year) you will receive the Book Club News, describing the coming Main Selection and Alternate Selections, together with a dated reply card. In addition, up to 4 times a year, you may receive offers of special selections, always at substantial discounts. • If you want the Main Selection, or the special selection, do nothing and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card, and return it by the date specified. • You will have at least 10 days to decide. If because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

81910. SYSTEMS AND PROGRAMMING STANDARDS. Susan Woodrige. An essential guide to establishing workable standards in any computer installation. **\$12.50**

59920. MANAGEMENT: Tasks, Responsibilities, Practices. Peter F. Drucker. A brilliant task-focused handbook of the skills, techniques and tools a good executive needs. **\$17.50**

62811. MODELING AND ANALYSIS USING Q-GERT NETWORKS. A. Alan B. Prister. Shows how to write program inserts, retrieve sub-programs, edit and link similar subnetworks, and much more. **\$17.50**

39970. COMPUTER ARCHITECTURE. Second Edition. Caxton C. Foster. Covers microprogramming, switching circuitry, memory speed increases in mainframes. **\$16.95**



The Library of Computer and Information Sciences 7-A3E Riverside, New Jersey 08075

Please accept my application for membership and send me the three volumes indicated, billing me only \$3.95. I agree to purchase at least three additional Selections or Alternates during the first 12 months I am a member, under the club plan described in this ad. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.
3 books for \$3.95

Indicate by number the books you want.

A few expensive books (noted in book descriptions) count as 2 or 3 choices.

Name

Address

City

State Zip

(Offer good in continental U.S. and Canada only. Prices slightly higher in Canada.)